THE AMERICAN GAS LIGHT JOURNAL

PUBLISHING OFFICE No. 42 PINE STREET

DEVOTED TO THE INTERESTS OF ILLUMINATION, HEATING, MECHANICAL, CHEMICAL AND GENERAL SCIENCE.

VOLUME XCII., No. 9. Whole No. 1,812. | NEW YORK, MONDAY, FEBRUARY 28, 1910. | $3 PER ANNUM, IN ADVANCE.

A. M. CALLENDER & CO., Proprietors. C. H. WADELTON, Manager. THOMAS J. CUNNINGHAM and ELBERT P. CALLENDER, Editors.

ENTERED AT THE POST OFFICE AT NEW YORK, N. Y., AS SECOND-CLASS MATTER.

CONTENTS.

An Asterisk (*) Denotes an Illustrated Article.

OFFICIAL NOTICES—

March Meeting, New York Section, Illuminating Engineering Society 385

Annual Meeting, Illinois Gas Association 385

Wrinkle Department, American Gas Institute 385

Bureau of Information, American Gas Institute 385

EDITORIALS—

Briefly Told 385

Southern Gas Association—Publicity—February Meeting, New York Section, Illuminating Engineering Society—Definitions of Industrial Terms—Obituary Note, Mr. George Henry Brown—Current Mention.

Detailed Statement of Washington (D. C.) Gas Light Company, Year Ending December 31, 1909 387

Report of Proceedings, Fourth Annual Meeting, American Gas Institute—Continued from page 345 388

Second Day, Technical Session—Joint Discussion of Papers by Messrs. Lamson and Africa.

Second Annual Meeting, Indiana Gas Association, Held in the Claypool Hotel, Indianapolis, Ind., Jan. 19 to 20.—Continued from page 349 390

First Day, Morning Session—Discussion of Paper by Mr. Philmer Eves—First Day, Afternoon Session—Election of Officers—Analytical Work on Raw Materials and Coal Tar Products, by Mr. A. B. Davis—Discussion—Second Day, Morning Session—The Gas Arc, by Mr. D. A. Barnes—Discussion.

SPECIAL ENGLISH CORRESPONDENCE 397

Standard Test Burners—An Impracticable Notion—Some Business-like Ways of Advertising.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES 398

New Holder for Sheboygan, Wis.—Securities of the Union Railway, Gas and Electric Company, Listed—Portland, Me., Banquets—Extensions at Holyoke, Mass., Meriden, Conn., and Colorado Springs, Col.—New Incorporations—Returns from Staten Island, N. Y.—Election at Wilkes-Barre and Easton, Pa.—Wilmington, Del., Declares Dividends—Incorporators at Sayville, N. Y.—January Earnings, Massachusetts Gas Companies—Legal Decision at Pueblo, Col.—Notes from Southern California—And Other Items.

The Market for Gas Securities 400

[OFFICIAL NOTICE.]

March Meeting, New York Section, Illuminating Engineering Society.

OFFICE OF SECRETARY,
227 FULTON STREET,
NEW YORK, FEB. 24, 1910.

The March meeting will be held on the evening of Thursday, the 10th, at 8:15 o'clock, in the United Engineering Society's Building. The papers of the evening will be "The Relationship of Decoration to the Illuminating Engineer Practice," by Mr. C. R. Clifford, author "Color Values," "Decorative Period." Member of Jury on Decoration, Louisiana Exposition (St. Louis); "Color Measurements of Illuminants, A Resumé," by Dr. H. E. Ives, Physicist, National Electric Lamp Association; and "A Standard for Color Values of Artificial Lights—The Moore White Light," by Dr. McFarlan Moore, Inventor Moore Vacuum Tube Light. Subjects will be illustrated by stereopticon views, also demonstrations. Dr. E. P. Hyde, President of the Illuminating Engineering Society, will preside.

A. J. MARSHALL, Secretary.

[OFFICIAL NOTICE.]

Annual Meeting, Illinois Gas Association.

ILLINOIS GAS ASSOCIATION,
OFFICE OF SECRETARY,
ELGIN, ILLS., Jan. 21, 1910.

To the Members, Illinois Gas Association: The next meeting of the Illinois Gas Association will be held at the La Salle Hotel, Chicago, Ills., March 15 and 16, 1910. A number of excellent papers have been prepared, and an enjoyable meeting is assured.

Yours truly, C. B. STROHN, Secretary.

[OFFICIAL NOTICE.]

Wrinkle Department, American Gas Institute.

WRINKLE DEPARTMENT, AMERICAN GAS INSTITUTE,
OFFICE OF EDITOR, ELECTRIC AND GAS BUILDING,
ATLANTA, GA., Jan. 10, 1910.

To the Members of the American Gas Institute: Please forward contributions for the Wrinkle Department to the above address. I would suggest that each manager address a letter of solicitation to the head of each department of his Company. Kindly assist me in this work I have undertaken, and greatly oblige, Very respectfully yours,

R. C. CONGDON, Editor.

[OFFICIAL NOTICE.]

Bureau of Information, American Gas Institute.

DETROIT CITY GAS COMPANY,
ENGINEERING DEPARTMENT,
DETROIT, MICH., Nov. 26th, 1909.

To the Members, American Gas Institute: Send questions to be submitted to the Bureau of Information for answer to V. F. Dewey, Chairman, Gas Office Building, Detroit, Mich. The Bureau of Information respectfully solicits your troubles. Yours respectfully,

V. F. DEWEY, Chairman.

BRIEFLY TOLD.

SOUTHERN GAS ASSOCIATION.—The second annual meeting of the Southern Gas Association proved that the value of this kind of work has been rapidly appreciated by those throughout the entire South. The attendance was well over 50, and no less than 23 new members were admitted. The officers for the ensuing year will be as follows:

President—H. W. Frund, Salisbury, N. C.
First Vice-President—H. B. Hoyt, Jacksonville, Fla.
Second Vice-President—R. J. Chambers, Montgomery, Ala.
Secretary and Treasurer—J. Ferrier, Rome, Ga.
Directors—R. M. Redding, Macon, Ga.; J. T. Pullen, Jackson, Miss.; H. M. Moore, Austin, Tex.; W. G. Leet, Greenville, Miss.; J. P. Ingle, Baton Rouge, La.; E. M. Osbourne, Talladega, Ala.; M. Morgans, Chattanooga, Tenn.; V. B. Day, Mongomery, Ala.

Owing to the fact that the New England Association of Gas Engineers hold their meeting in February, it was decided to change the date of meeting to April 19th, 20th and 21st, 1911, Montgomery, Ala. being the city selected.

LIBRARY OF CONGRESS
FEB 26 1910
SMITHSONIAN DEPOSIT.

PUBLICITY.—There is probably no city more favorably situated for legislative investigation, departmental proroguing and civic righteousness assuaging than our Capitol, Washington. When any of these almost multitudinous inquiries come to light, the local Company has always shown a commendable zeal in meeting the crusaders with open hearts. Not so long ago the carbon monoxide itinerent received its quietus and the present bee which is buzzing concerns the straight and narrow path and the open book with a Public Service Commission, as the Cordon Bleu. (We presume that the present District Commissioners would not allow a newcomer greater authority than their own.) That the open book may be had without additional probing is evident from the page "ad." which appeared in several Washington papers and which we reproduce on p. 387. The report is required by Act of Congress, but its wide publicity is due to the wise policy being pursued by the McLean, McIlhenny, Hart triumvirate.

FEBRUARY MEETING, NEW YORK SECTION, ILLUMINATING ENGINEERING SOCIETY.—A paper by Messrs. George W. Knight and A. J. Marshall, on "Public School Room Lighting," was read by the former, before a rather small gathering, due in large part to the inclement weather, at the regular February meeting of the New York Section of the Illuminating Engineering Society in the United Engineering Society's Building, New York city, on the evening of the 17th inst. Mr. Knight's paper covered a number of tests which were made with various types of electric lamps and reflectors in school class rooms at Newark, N. J., arranged so as to give as great a uniformity as possible. It was found that the average intensity required to give satisfaction should be at least 3-foot candles. Chairman E. L. Elliott called upon Mr. Hatch, of Boston, whose work for the Boston School Board has received much favorable comment to discuss the paper, and he stated that from the results of their experiments which have been conducted during a period of over 2 years, it was found that 9 single units arranged to the left and forward so as to give a unilateral distribution, instead of being equally spaced, had been found to be the most successful. He stated that the nearer we approach daylight conditions the better the results, and it was more important to have the light coming obliquely over the left shoulder than it was to have an equal intensity on each of the various desks throughout the room. Mr. Thomas, of the Board of Education of New York city, stated that they had adopted nine 100-watt Gem lamps with opalux reflectors located forward and to the left as is the case in Boston. He also stated that the intensity obtained ranged from 3.1 to 3.4 foot candles. Mr. Jones criticized the Newark installation on account of the attempt to obtain uniform instead of unilateral distribution, and he was followed by Mr. Owens, who stated that he hoped that the indirect lighting enthusiasts would read the discussion at this meeting as it appeared from the reports of a recent meeting of the Chicago Section, that absolute uniformity was the chief desideratum. The question of table lamps versus general lighting in reading rooms was then brought up, and quite thoroughly discussed but not settled, by Messrs. Jones, Elliott, Hatch, Marshall and Owens.

DEFINITIONS OF INDUSTRIAL TERMS.—The American Chemical Society has appointed a committee to consider Definitions of Industrial Terms, and begs to announce that at the recent meeting, in Boston, of the Division of Industrial Chemists and Chemical Engineers of the American Chemical Society, a committee was appointed by the Chairman, under authority of the By-Laws of the Section, "On the Definition of Industrial Terms." In constituting this committee, it is the desire of the Division that it co-operate, as far as possible, with trade organizations in the several lines of industry in formulating definitions of their products, which shall be as accurate and as fair as possible to the interests involved. The organization of such a committee has been suggested by various interests who desire a more authoritative definition of industrial terms, such as "petroleum ether," "gasoline," "gasolene," "benzol," "bronze," "benzene," "steel," "Portland cement," etc. It is proposed, when an interest is expressed for the definition of terms in any special field of industry, to organize a sub-committee to consider this field and define the principal terms in use in it. The General Committee is desirous of receiving suggestions from all who are interested in the subject as to terms which are considered the most important to be defined at the present time, owing to ambiguities which may now exist, and as to the best methods of accomplishing the work. The value of authoritative definitions as approved by the Industrial Division of the American Society will, of course, be recognized. Communications should be addressed to Clifford Richardson, No. 30 Church street, New York city.

OBITUARY NOTE, MR. GEORGE HENRY BROWN.—To this heartfelt narration we can add nothing that would better it, so we take this opportunity of putting before our readers this plain story, by Mr. Egner, of a life that was usefully spent in the gas business, although its subject may not have been as well known to the fraternity as his constancy to its best interests in an unobtrusive way was well indicated by his career. Mr. Egner's story is:

"TACOMA, WASH., Feb. 18, 1910.

"MR. F. EGNER, Norfolk, Va.: Father passed away this morning.—FRED." This simple message conveyed to me the news of the end of George Henry Brown, who is survived by a widow and five children, one of the latter still a baby. Deceased was born in New York, February 26, 1860, and in 1868 became a member of my family as in that year I married his sister. His mother, then a widow, who also came to live with us, died some years ago of tuberculosis, and, fearing the boy might have inherited that dreadful disease, and with the idea of eradicating it from his system, after graduating from the public school that he attended, we indentured him on the nautical school ship "St. Mary's," Port of New York, to take the nautical course. Graduating in time with honor, he followed the sea for about 5 years, always on the same ship of the same line, which sailed from New York around Cape Horn to San Francisco, from thence to various ports in Europe, returning to New York, to restart therefrom at the named time. He passed through the grades of boatswain, third mate and second mate, and was going on to the position of first mate, when he balked, getting tired of the monotony of the deep sea. Then for a while he served as second mate on one of the Old Dominion Steamship Company's vessels, plying between New York and Norfolk, Va. When I became connected with the Norfolk works as Chief Engineer I advised him to take service with me. This he did. He began at the beginning, first serving as retort house fireman, then as purifier house helper, and successively became timekeeper, clerk, assistant, and finally superintendent. There was no more practical or experienced gas man in all branches of the trading than was Mr. Brown at the completion of his lengthy and well-kept apprenticeship. And about this time I might mention that in the early days of gas making at Coney Island, N. Y., Mr. Brown was not only gas maker but all hands else. After this he was with me in Chicago, remaining there for some time until after I went to St. Louis. Eventually, having followed me to St. Louis, he was general night foreman and afterwards Superintendent of Station B of the Laclede Gas Company. Later on, after I received the appointment of Engineer to the Standard Gas Light Company, of New York city, he was with me during my rather peculiar incumbency of that position, an incumbency that met with most peculiar dealings on the part of those then in ownership of the plant, who, happily for the industry, are no longer connected with it. When the Borstwick revolution in the Standard concern was quelled, many of us had other fields to seek. Mr. Brown became attached to the works of the Morristown (N. J.) Gas Light Company, and in its service he remained actively, and with success, for 12 years. An excellent opportunity for advancement eventually offered itself, of which he took advantage. This obliged his journeying to Tacoma, Wash., in the service of which corporation, during two changes of executive administration, he retained his post, and I have no hesitation whatever in saying that Mr. W. A. Aldrich will whole-heartedly bear witness to Mr. Brown's skill as a gas engineer and to his honor as a man.

CURRENT MENTION.—

AT the meeting of the employees of the H. M. Byllesby Company, brought off last January in Chicago, in the papers that were especially well received was that prepared by Mr. Robert G. Hunt, whose theme was "Gas Manufacture and Distribution." Although it was elemental its story was well and plainly told.

MR. R. C. CORNISH, Assistant General Manager of the St. Joseph (Mo.) Gas Company, has resigned to join the home staff of the American Gas Company, of Philadelphia, Pa.

THE stockholders of the Mobile (Ala.) Gas Company have authorized an issue of $3,000,000 in bonds, to be used principally for extensions.

THE Amherst (Mass.) Gas Company has decided to abandon its oil gas plant and install a water gas set.

ACCORDING to the present plans the following cities and towns will soon have a gas supply: Provo, Utah; Toms River and Sea Isle, N. J.; Garden City, Kas.; Mesa, Ariz.; East Bangor, Me.; Achor, O., and New Ulm, Minn.

Detailed Statement of Washington Gas Light Company, Year Ending December 31, 1909.[1]

OFFICE OF THE WASHINGTON GAS LIGHT COMPANY,
WASHINGTON, D. C., Feb. 1, 1910.

SIR: I have the honor to transmit herewith a detailed statement of the business of the Washington Gas Light Company for the year ending December 31, 1909. JOHN R. McLEAN, President.

Value of plant (exclusive of working capital and franchises)		$8,603,539.95
Amount of paid-up capital stock		2,600,000.00
Amount and character of the indebtedness of the Company:		
Dividend certificates of indebtedness.	$2,600,000.00	
Improvement bonds	598,700.00	
Rate per annum on funded debt, 4 pr. ct. and 6 pr. ct., averaging 5.625 pr. ct.		3,198,700.00
Receipts.		
Gas sales to December 1, 1909	$1,754,772.88	
Gas, December bills and good arrears	211,161.18	
		1,965,934.06
Revenue from Sale of By-products:		
Coke	$64,043.26	
Tar	12,438.60	
Ammoniacal liquor	5,078.20	
		81,560.06
Use of services		38,472.42
Total receipts from operation		$2,085,966.54
Sundry materials, etc	$1,277,997.50	
Repairs to plant	87,622.69	
Depreciation and renewal	73,714.85	
Operating expenses		1,439,335.04
Net earnings from operation		$646,631.50
Income from other sources		25,702.09
Gross income after deducting operating expenses		$672,333.59
Deductions from Income and Surplus.		
Miscellaneous, as per detailed statement	$25,043.67	
Extension of plant and construction	178,480.39	
Interest: On funded and bonded indebtedness	$179,948.00	
" Collateral deposits	7,216.56	
	187,164.56	
Dividends: Regular	$260,000.00	
" Extra	260,000.00	
	520,000.00	
		910,688.62
Amount from surplus		$238,355.03

Detailed Statement of Operating Expenses and Other Expenditures, Including Taxes, but Excluding Capital Charges of all Kinds.

Coal, bituminous 35,338—1,950-2,240 tons Coal, anthracite 28,011—1,505-2,240 tons		
63,350—1,215-2,240 tons	$258,179.23	
Steam 1,048—1,800-2,250 tons	3,275.13	
Oil 8,657,989 gallons	296,969.02	
Lime	2,245.33	
Purifying material	11,360.64	
Wages paid to inspectors and miscellaneous labor	118,280.56	
Salaries: General office salaries, including law and legal expenses and to clerks in all departments	193,846.22	
		$884,156.13
Taxes paid collector, District of Columbia	$131,103.95	
Water rent	637.72	
U. S. Inspector Gas and Meters	4,541.60	
D. C. Laboratories for inspection, gas and meters	1,000.00	
District of Columbia, Inspector Plumbing	955.86	
		138,239.13
Distribution Department and Orders' Office.		
Wages and superintendence	$50,869.41	
Material, including repairs to street pavements	34,944.30	
		85,813.71
Advertising and insurance	$32,663.16	
Expense:		
Office	16,808.94	
West Station Works:		
Wages	$39,906.54	
Material	7,321.74	
	$47,228.28	
East Station Works:		
Wages	$17,233.26	
Material	1,569.16	
	18,802.42	
Repairs, General:		$115,502.80
Wages	$14,537.44	
Material	30,225.45	
	44,762.89	
Repairs, East Station:		
Wages	$9,214.74	
Material	5,467.80	
	14,682.54	
Repairs, Meters:		
Wages	$12,825.75	
Material	3,871.73	
	16,697.48	
Repairs, Street Mains:		
Wages	$11,128.02	
Material	351.76	
	11,479.78	
		87,622.69
Street Lamps:		
Wages	$2,190.00	
Material	3,214.38	
	5,404.38	
Use of Services:		5,404.38
Wages	$34,613.07	
Material	14,268.28	
		48,881.35
Depreciatiation and renewal account	161,337.54	
Less repairs	$44,762.89	
Repairs, east station	14,682.54	
" meters	16,697.48	
" street mains	11,479.78	
	87,622.69	
		73,714.85
Miscellaneous:		
Contributions to charitable objects	$810.90	
Coke for charity	58.70	
Christmas contribution to wage men and clerks	2,215.00	
Loss, premium U.S. 4 per cent. bonds	15,625.00	
Meters condemned and destroyed	4,095.27	
Sundries	194.25	
Damages	852.55	
Washington Gas Light Co. Employees' Relief Association	1,192.00	
		25,043.67
Extension of Plant and Construction:		
New gasholder, sundries	$8,984.12	
Meters	16,088.97	
Street mains	114,843.17	
Wages	5,624.28	
Salaries	18,249.94	
High pressure engine	2,565.00	
Engine house	724.17	
New booster house	1,547.60	
Metal ceiling, guttering, etc	210.89	
One engine and dynamo	600.00	
One 60-inch Sugg Letheby photometer	550.00	
Three jet photometers	140.90	
One temperature regulator	350.00	
New pump account	666.00	
Horses, cart, etc	665.00	
One Fairbank's separator	264.48	
Pipe, fittings, cement and sundries	6,405.92	
		178,480.39
		$1,642,859.10
Gas manufactured, cubic feet		2,304,822,000
Less condensation, leakage, and used by Company, cubic feet		250,086,529
Gas sold and accounted for		2,054,735,471
Average price received per 1,000 cubic feet sold (cents)		$0.9578
Average gross cost, exclusive of interest, dividends, and construction account, per 1,000 cubic feet sold (cents)		0.62197
Average net cost per 1,000 cubic feet sold, after deducting from gross cost proceeds of by-products (cents)		0.58228
Average candle power for year 1909, taken from United States Inspector's report		23.48
Total number of consumers' meters in use January 1, 1910		49,461
Actual cost of extensions and construction paid from earnings		$178,480.39
Amount expended for labor		347,919.60
Amount set aside and paid in interest		187,164.56
" " " " " dividends		520,000.00
" " " for depreciation, renewals, and repairs		161,337.54
Number of employees (average)		608
Total number of stockholders		1,026

1. This is a reproduction of a page advertisement which recently appeared in various Washington, D. C., newspapers.

[CONTINUED FROM PAGE 345.]

REPORT OF PROCEEDINGS, FOURTH ANNUAL MEETING, AMERICAN GAS INSTITUTE.

HELD IN THE HALL OF ELKS, DETROIT, MICH., OCTOBER 20, 21 AND 22, 1909.

SECOND DAY—MORNING SESSION, Oct. 21, 1909.—*Technical Session.*

Joint Discussion on the papers by Messrs. Lamson and Africa.

The Chairman—Gentlemen, these two papers are before you for discussion.

Mr. Wheeler—Mr. Chairman, I have had the pleasure of visiting Mr. Lamson's works, and was charmed by the beautiful exposition he has there of scientific gas manufacture. I was struck with the great difference in the B.T.U.'s and the volatiles of the coal which Mr. Lamson uses, compared with the coal used by Mr. Africa. There is a difference of 6 per cent. in the volatile matter, and of over a thousand in the heat units, yet Mr. Lamson gets 5.95 to 6 feet per pound, corrected, and Mr. Africa only got 4.82. Mr. Lamson speaks of the low pressure that he carries in his retort; that is one of the reasons why he gets his high candle power, but I should like to ask Mr. Lamson if at any time during the past year he has automatically controlled that pressure at the time that he discharges the retorts by throwing on extra pressure, by means of a valve system and flooding his hydraulic main with liquor, so as to increase, temporarily, the pressure on the retorts while the discharge and recharging of retorts is taking place. That is a very important point, and it seemed to me while I was there that his foreman threw the lever and changed the pressure almost an inch by some method of temporarily flooding his main. It is a very important point, because he kept his candle power and also his B.T.U.'s very even by this method. He analyzes the three processes of making gas, three systems of handling gas from the producer into the benches, and he is very specific in describing the Worcester method, and then he speaks of a second method of using waste gases in dissociating the carbonic acid, and later he analyzes the chemical factors and arrives at a table in which he gives the B.T.U.'s per pound of fuel consumed. Now, of course, in doing such analytical work there is always an error which is likely to creep in, but it seems to me that in the first process he has figured 12,496 B.T.U.'s per pound of fuel, and in the second process 12,688, showing an increase. Taking the physical factors given, and running through the calculations rapidly, the figures that I make are 13,000 in round numbers for the first process and 13,400 for the second. Of course, that is a proportion well within the limits of errors in calculation, yet it is a very significant thing, because the second process, apparently, produces a great many more B.T.U.'s than the first process. The extraordinary evenness of the heat is very remarkable and the ash produced is fine and clear, while the labor cost is very low. It is a remarkable example of scientific principles carried out in a careful and scientific manner by a highly trained technician. It is an object lesson, not only in the construction, but in the operation, of a superb plant, with a chemical balance and a thermometer in use all the time.

The Chairman—Mr. Fowler, have you anything to offer?

Mr. Fowler—We have listened to Mr. Lamson's description of the new retort house at Worcester and his statement concerning the results obtained and the reasons therefor with the greatest interest and pleasure. I, for my part, congratulate him on the possession of the most efficient and best looking horizontal retort house in the world, and I also wish to express my appreciation of the technical, scientific and inventive ability of the engineers who designed and erected the plant which marks a new departure in the manufacture of coal gas. The daring and confidence which guaranteed a production of gas equal to more than 1,300 feet per running foot of horizontal retort excite our heartfelt admiration and command our highest praise. The fuel used in the bench, measured in relation to the coal carbonized seems rather high, but measured in relation to the candle feet produced from the coal it is very low. In the new bench the fuel record is better than it would have been in the old bench if they had used therein only 11 pounds of fuel per 100 pounds of coal carbonized. In comparison with the plant at Worcester ours is a very modest one, but a few remarks concerning it may be of interest. The carbonizing plant of the Charlestown Gas and Electric Company consists of 6 half-depth benches of 8 through retorts, each fired from internal furnaces at each end of the bench. The grates are 5 feet 2 inches below the bottom retorts and are 5 feet long and 12 inches wide. There is a division wall through the middle of each bench independent of one another so far as heating is concerned. The retorts are 15 inches by 26 inches by 20 feet long, and are set in the benches in two vertical rows. Standpipes are provided at one end of the retorts only. Five standpipes serve the 8 retorts of each bench; the top retorts each having a standpipe 8 inches in diameter, while the other 6 retorts are connected in pairs to 3 standpipes 10 inches in diameter. The width of the arches is 7 feet 6 inches, and the thickness of the partition walls is 18 inches, making the arches 9 feet from center to center. The block, settings and retorts are of fireclay material, furnished by Adam Weber Sons Company. The settings are open. The whole plan is the same as that of the Weber half-depth six retort bench, except that there are more retorts and that the furnace is slightly enlarged. A full description of the plant as it then existed was read at the meeting of the New England Association of Gas Engineers in February, 1906, and can be found in the technical papers of about that time. It was originally intended to operate the house by hand exclusively, but little by little it has been changed to a machine house. In the old retort plant, which consisted of 12 benches of 6's 9 feet long, and which occupied the exact area of the present block, we made a gas which required considerable enrichment to bring it to a safe margin above the 16-candle power required by the Massachusetts law, and in starting the new plant in December, 1905, we continued to use oil in cartridges. But we soon found that no enricher was necessary. We, therefore, discontinued its use in February, 1906, and have used none since that time, with the exception of about 3 weeks, and then we couldn't see that it did us any good. It was difficult for us to find out exactly what we were doing during the first year and a half after the benches were started, for we did not make all the gas we sent out. The only station meter we had was used to measure the gas we bought from the Boston Consolidated Gas Company. But when that station meter was not in use for the Boston Company's gas, we made some tests of which the following, by Dr. Wing, of the Boston Company, and Mr. Haddock, of the Cambridge Company, is an example:

May 20, 1906.

Two benches of 8 retorts each in operation. Coal carbonized in 4 hours, 11,200 pounds. Gas made per pound of coal, 5.0178. Average candle power, 17.99. Candle feet per pound of coal, 90.27. Temperature of gas at station meter about 70°. This was with 4-hour changes of 700 pounds each per retort. The burner used for testing was a Sugg D with low ring. At this same time, as you will have noticed by Mr. Lamson's paper, he was getting in Worcester about 70-candle feet per pound of coal. We both buy the same kind of coal, except that he gets his all rail and from some particular mine openings which he has reason to believe produce an especially good coal. My coal is a mixture. So far as I am able to judge, a yield of approximately 70-candle feet per pound of coal is about what was generally obtained. It is about what is generally attained in most of the gas works near Boston. Also so far as I can find out the Charlestown Company is the only one in Massachusetts which makes such a coal gas that it can send it out in Massachusetts without enrichment. At the meetings of the Guild of Gas Managers, which are held once a month, the difficulty of getting a gas in pure coal gas works which would be above the 16-candle power required was often the topic of debate. The relative advantages of oil and benzol were discussed and the difficulties attendant on the use of each were stated. I stated that it was entirely unnecessary to use either, for I was not reticent about the results we were getting. My statements were met by smiles of incredulity. In the latter part of 1906 we went on to machine charging and pushing, and in May, 1907, we put in another station meter; so that from that time our results have been determined exactly. During the last year, from July 1, 1908, to June 30, 1909, we have been running 6-hour charges of about 1,125 pounds each and the average yield and candle power as found at the works have been 5.04 (corrected) and 17.25 or 86.94 candle feet per pound. This is for the whole year. Such benches as these which ought to make 180,000 feet per day are a very large unit for a company whose maximum monthly average is only 1 million, and its minimum about 560,000 feet per day. Half the time the benches cannot be run to their full efficiency. During February, 1909, however, our results were:

Yield (corrected)	5.24
Candle power	17.32
Candle feet per pound	90.76

We have no facilities for taking the temperature of the arches and retorts, but a test taken for an outside party showed an average of 2,422° F. between the two bottom retorts, and 2,346° between the two

just above them. The average temperature inside the retorts was 1,928°. A later test gave an average temperature of 2,374° between the bottom retorts and 2,199° between the two just above them. The temperature of the gas was taken as follows:

Time.	One Foot Above Mouthpiece. Degs.	Bridge Pipe. Degs.	Gas Leaving Hydraulic Main. Degs.
10:20	805	440	212
11:05	790	420	196
12:45	660	330	188
2:00	850	600	260
3:00	...	540	204
3:10	...	...	250
3:45	775	500	196
5:00	725	480	240
Average	767	473	218

An analysis of the gas made by the State Gas Inspector is as follows:

Illum.	4.91 by vol.	N_2	0.97 by vol.
CH_4	33.55 "	O_2	0.10 "
H_2	51.21 "	CO_2	1.21 "
CO	8.05 "		

Candle power 17.9 with Sugg's new D burner and 7-inch chimney. On another day the specific gravity was found to be .451. The calorific value of the gas has not been taken, but it is evidently high. Neither our yield nor our candle power has been improved by the adoption of heavy 6-hour charges instead of light 4-hour charges. Four-hour charges we cannot push, and the labor involved is somewhat greater than for 6-hour charges; also the coke is not as good; but we used to get just as much and just as good gas as we are now getting from the 6-hour charges. With our little furnaces holding such a small amount of fuel it is an impossibility to maintain an even heat in the benches, such as is demanded for the attainment of the best results. Our average heats are not high, no higher than they were in our old plant, consequently I cannot believe that the difference in our results is due to the treatment of the coal in the retorts. I believe it is due to the treatment of the gas after it leaves the retort, but I have not proved it. When running efficiently our mouthpieces are dry and so are the standpipes. We do not average one stopped standpipe per month per bench. It is a queer condition. We have the old fashioned, simple, half-depth furnace doing work nearly half as much again as it is usually called upon to do, and day by day and year by year we are making a better gas than almost anyone else, though the yield per pound may be exceeded. But for a company without a water gas plant we make a thoroughly utilizable gas, which gives satisfaction to our consumers, both as a light and heat-giving commodity. I am now building 3 additional benches which will have but 1 furnace for each bench of 8 retorts, 20 feet long, and which will have 10-inch standpipes and cross connections. I hope that the larger furnace will enable us to carry more even heats, so that our production will be increased without any sacrifice of the candle power. My ground for the hope is that as a general thing the high yields are accompanied by high candle power. This isn't true every day, but, taking the general run of works, the higher the yield the better the candle power. The idea that the making of an extra ½ foot of gas would lower the candle power of the total make has been proved to be entirely false in our case. I can only express my regret that I cannot tell the Institute why this is so. For bringing coal from the coal shed into the retort house, charging it in the retort, pushing the coke out, conveying it out of the retort house, elevating it 60 feet, and crushing what is required, we use 1½ kw. hours per ton of coal.

The Chairman—Mr. Taussig.

Mr. Taussig—I think one of the most notable features of the Worcester plant is the furnaces; being able to run a coal gas bench, and have absolutely uniform heats all through the 24 hours, month in and month out, is a very great advantage to any coal gas man, and I think the sooner the coal gas industry adopts the return of the CO_2 to the bottom of the grates the better it will be for it. One of the great advantages is the lowering of the temperature in the combustion chamber and still putting a large quantity of heat through the retort chamber. To think that Worcester can run 2,000° in the retorts with 2,400 and a fraction degrees in the combustion chamber is marvelous. I think there are very few plants with full-depth benches that do not run as high as 2,600° in the combustion chamber, and then they have a very inferior heat up through the stack. The reason for this, as you all probably know, is that the flame temperature is lowered by the heavy increase of nitrogen, and still the total heal sent through the bench is just as great. I think it is of very great value to the gas industry, in general, to have such furnaces. Speaking of the material, such a material as used in the Worcester plant, which is a very high silica brick, is impossible in an ordinary coal gas setting. You cannot for a minute run the ordinary coal gas setting, where the fires are frequently clinkered, with this silica brick. It expands, in the first place, a ¼ of an inch to a foot, which is an excessive expansion. Imagine the changes of temperature, with poor clinkering and poor fires in an ordinary coal gas setting, and yet this material, kept at constant temperature as it is in the Worcester settings, will last a long time, and has considerably higher conductivity. Another feature I think is the filling of the retort. I think the fuller you can get the retort, the better, and I attribute much of the high results, as far as the candle feet at Worcester are concerned, to the fact that he has filled his retorts and been able to get his gas out quickly. It is very probable that a great deal of the gas does not go up through the coal, because his picture indicates that a good deal of gas went along the core of the coke. In our vertical retorts, no matter whether using broken coal or slack coal, we have proved conclusively in our works at Manchester that the gas goes right up through the middle of the coke. You can see it going out through the core of the coke; at times you can put a rod just in the middle of the core, and there will be a regular fountain of gas coming up. There is some back pressure in the vertical retorts. Now, as to these vertical retorts there is a great discrepancy in yields compared with the yields at Worcester. Part of this discrepancy may possibly be due to slight leaks in the retorts. We have five different retorts of different sizes, and these retorts were connected up in pairs, 3 in one row, and 2 in another. In order to get a uniform candle power, we had to charge them at intervals, so that the rich gas would mix with the poor; otherwise we would have a very rich gas at first, the candle power would be 20-candle power and go down towards the end of the charge. So a yield of 4.82 is not, by any means, a fair example of the yields of vertical retorts. In Germany they get almost as high yields as Mr. Lamson has obtained with his horizontal retorts—I do not know that they have gotten quite as high, but then they have a very much poorer coal. There is one point to be demonstrated with these vertical retorts, that it is possible to make a high candle power. Mr. Lamson's candle powers were taken with an Argand burner. The answers by the Bureau of Information were very carefully made up, as I know, for I know who made them, and there is about a 4-candle power difference between the results with a Sugg D Argand and a flat flame burner. Now, if you should add 4-candle power to 16, as we got at Manchester, and make 20-candle power gas, and multiply that by approximately 5, you would have about 100-candle feet, which in candle feet is very nearly the same. There is one point to be demonstrated that I think is very interesting. Last year I mentioned that we left a space on top of the coal, in order that the tar vapors could be fixed after they left the coal. To my mind it was an ideal way of carbonizing coal; every foot of gas that went up through that retort had to go between 3 and 4 feet of fixing surface, and every foot was treated exactly alike. I have always maintained that you could get high candle power with vertical retorts, if you treated the gas so as to make benzol vapors. We had a high candle power, it was hard to believe it was not over 20, compared with ordinary water gas flame, and I think most of this was due entirely to the effect of this fixing surface. We can regulate the fixing surface to any height we want, and we ought to be able in that way to get the highest candle feet possible in coal, with a well-designed setting. In Europe, where they have parallel stacks of verticals and horizontals, they always state that they get higher candle power with the horizontal, and they have shown that there is 1 to 2-candle power difference, but in Europe they fill their retorts up to the top; the gas we know comes out cold, they take pyrometer tests right over the coal, and we know the gas does not reach any temperature sufficient to make much benzol vapors; therefore, they get a high heating value, but they don't get the benefit of the enriching work of the benzol vapors. We in the East have to make candle power in most cases and it is a very important item. Of course, under such conditions we cannot afford to fill our retorts up to the top.

The Chairman—Mr. Brown.

Mr. R. B. Brown—I think, in discussing this paper, some of you gentlemen have forgotten entirely the very thoroughly worked out mechanical details of this plant. Of course, as far as the results obtained from the pound of coal is concerned, those mechanical details may not have much effect, but they certainly will show up in the cost of operation and in the maintenance. As to the furnace operation, I agree very closely with Mr. Taussig that uniformity in heats and the ability to obtain a uniform temperature, approaching 2,000° inside the retorts, with a quite moderate temperature in the combus-

tion chamber, is a great advantage in a setting. But I want to tell Mr. Taussig and the rest of you that he is absolutely wrong when he says that you cannot use this material in an ordinary bench. In Milwaukee we have had under operation for about 4 years a bench which was designed on very similar lines to these benches and with the identical material. We were told by the manufacturers that it could not be worked up and down as to temperature without destroying it; so we attempted to destroy it, and we have had it down cold more than 10 times—I think it has been cold 12 times in 4 years, and last summer during 4 months it was down to a temperature of under 1,500° 27 times. In that bench we have not lost a retort. We have lost 3 or 4 sections by cracking and dropping out. It is very easy to replace them, and we have had no trouble in doing so, but the amount of punishment that bench has had would have put many old-time clay block and retort benches out of business. If you use that class of material, with decent care, it will stand up. The question of chemieal results from the distillation of coal is certainly largely one of temperature, and while at Worcester they are burning large charges and their retort temperatures are high, I want particularly to call attention to the fact that their gas temperatures are low. They fill the retorts almost full. There isn't any gas space left. The gas comes out of the retort without being subjected to the destructive breaking down effects of extremely high temperatures, and I think that we must figure that many of the remarkable results obtained there in the chemical character of the gas, its composition and the quantities of certain constituents and their preservation, are due to the temperature conditions. Carrying the gas out in that way has had another effect which perhaps was unexpected, and that is the way the standpipe troubles have been eliminated. They are practically gone; in fact, they are actually covering their standpipes with non-conducting material to maintain the temperatures of the hydraulic main, and some of the older gas men who saw that experiment tried, 15 or 18 years ago, I think, will remember that it absolutely killed their operation, that it put their standpipes out of use, and they had to abandon the idea. Now, certainly we have not got the same conditions here; we are using practically the same coal, and we are getting an entirely different character of gas, and the whole difference in the operation appears to be in this question of standpipe temperatures; in other words, of the temperatures of the gas coming off. There is another fact which I think Mr. Wheeler mentioned, but it must not be forgotten that you cannot let a retort house run itself and it cannot be run without the closest attention to get such results. A good part of the actual quantitative results in a retort house are due, I am satisfied, to the minute care with which the small details of carbonization are carried out, and I think that is a lesson for all of us. I do not believe there is a man in this room who could not go back to his retort house to-day and get better results if he will exercise such care in the small details of carbonization as is exercised at Worcester. But all cannot get the results they are getting at Worcester without some changes in their equipment, but they might get better results than they are actually getting to-day if they will use more care in the operation. I do not think we ought to let this thing go without emphasizing that fact, that they do look after the little things in Worcester, and I do not know any reason why, with an organization properly perfected, that this cannot be done by everybody to some extent. After such a method is once put into operation, and after your men are once trained, it does not require so much care, but it does require actual knowledge of what you are doing and keeping right after your men to keep results up to the point that you have once reached.

Mr. Kennedy—I have seen the Worcester works and am very pleased to have been able to do so, but I want to say that, in addition to the many things brought forward, one thing has been overlooked—that is the scoop. I do not believe there is any scoop made to-day that will lay a full charge in a retort as evenly as the scoop that is used at Worcester. We have for 2 years been working with a charge which is absolutely as much as we can get into the retort. It works out practically 60 pounds per running foot. We have worked on that basis for 2 years, and that is practically the same as Worcester is working to-day, on the same size of retort. We find that where the yield was formerly probably 4.98 to 4.93 of 15¼-candle gas, the yield for the last month is 5,27 of 15.8 gas. We have brought our yields and candle feet up until for several days of a period, with high heats, we have maintained 95-candle feet. We have right along practically 84-candle feet, but I think it is essential that the coal be loaded in the retort practically even, following as closely as possible the suggestions in Mr. Lamson's paper. I find that there is no charging machine other than the scoop machine that can do it. Our machine is a De Brouwer machine, and with all due deference to the machine, which is a good and cheap machine to operate, there come times, due to the slackening of the belt, or changing in the size of the coal, when you cannot get a perfectly even charge, and we have found that we had to allow 2 inches to take care of that discrepancy in the level of the fuel. If we could correct that we could get a perfectly even charge. Another thing, I think the thickness of our front walls in modern settings is too little. We have thickened our walls by from 14 to 18 inches. Since we have done this we have had practically no standpipe troubles, whereas we did have serious trouble 2 years ago.

Mr. C. J. R. Humphreys—Mr. President, I will speak a little of the plant we have put in at Lawrence, but before doing so I wish to express my appreciation of Mr. Lamson's paper. I have had the privilege of seeing the Worcester works since the new plant has been put into operation, and it is certainly very interesting in many ways. I think that what impresses one the most on entering the house is what I might call its airiness; the house is so large, and the proportions are so big in every way that it is a very comfortable house to go through and must be a very comfortable house to work in. I want to say that I consented very reluctantly to speak of our Lawrence plant to-day—because I am not in a position to give results, and I, therefore, feel that what I can say is of little practical value. In a general way I will say that we have been putting in complete coal handling and coke handling apparatus, charging machinery, drawing machinery and pushing machinery, and a series of 6 benches of 8 retorts to the bench. The arches are 8 feet wide, the retorts are 15 inches by 26 inches and 20 feet long. The benches are heated by one furnace, that is placed on the discharging end. The furnace used is one of my own design that I used for a good many years in connection with the ordinary retorts, it is an outside furnace, and I suppose the only peculiarity about the furnace itself is that it is not rectangular as many furnaces are and as almost all were at the time I designed this furnace. It is more on the plan of an oval, and my idea in designing the furnace that way at the time was because I felt that in a rectangular furnace there was a chance for the coal not backing into the corners and making opportunity for air to come up through the coke bed. The depth of the furnace, I think, is about 6 feet. The problem I had to consider at the outset was whether I could heat these 20-foot retorts uniformly with one furnace. I can say now that we have accomplished in that regard all that I expected. We can heat the retorts evenly with the one furnace. The reason that I cannot give any results to-day is due to the fact that we are not yet perfectly under way; therefore, I cannot tell you anything about candle feet or what yield we get. It is for that reason that I was very reluctant to say anything. At present we are only running 5 benches, and we do not need to push the benches, as we make a large percentage of water gas, so that we are running about 21,000 feet to the retort. The candle power has been running about 17.3.

The Chairman—In this paper I am surprised to see that there is so much free carbon in the tar as is shown.

(To be Continued.)

[Official Report—Continued from Page 349.]

SECOND ANNUAL MEETING, INDIANA GAS ASSOCIATION.

Held in the Claypool Hotel, Indianapolis, Jan. 19-20, 1910.

First Day—Morning Session.

Mr. Carl H. Graf—It is now a quarter of one. In order that we may all feel free to discuss Mr. Eves' paper, I would suggest that we have this discussion close the session and then have a short afternoon session. I make a motion to this effect. [Seconded.]

The President—It has been moved and seconded that at the close of the discussion of Mr. Eves' paper we take a rest until 2:30 P.M., and then have the remainder of the programme, which is a lecture on "Chemistry," by Mr. A. B. Davis. All in favor of the motion may signify by saying "Aye." Contrary, "No." The motion is carried. I will ask the members of the Association to assemble promptly at 2:30 o'clock. Before we enter upon the discussion of Mr. Eves' paper, in order that the offer of Mr. Graf in reference to Mrs. Hawkins giving instructions to any demonstrators that any company may have, for the payment of a nominal sum, may be definitely brought before our Association and further considered, I would suggest the appointment of a committee to report to-morrow morning. Will some one make a motion to that effect?

Mr. D. A. Barnes—I move, Mr. President, that a committee be ap-

pointed to further consider Mr. Graf's offer to arrange for lessons to demonstrators. [Seconded.]

The President—Gentlemen, it has been moved and seconded that a committee be appointed to further consider Mr. Graf's offer in regard to lessons to demonstrators. All in favor please say Aye; contrary No. [Carried.] I will appoint Mr. D. A. Barnes, Mr. J. M. Ott and Mr. S. E. Mulholland. Mr. Eves' paper is now open for discussion. Mr. Mulholland, have you anything to say?

Discussion.

Mr. Mulholland—Mr. Eves' paper is not elementary. It was not intended to be. It is better than if it were. There have been 3 or 4 books published in the last 4 or 5 years on new business methods. Those books have in an elementary way gone into detail on various things advisable to do at different seasons. I think the paper that Mr. Eves has read to-day has taken a very broad line, that he has handled the subject in a very broad way, and, as far as discussing it is concerned, there is not very much left for anyone to say but Amen and add our approval. I do not believe there has been a proposition brought up or a method advanced by Mr. Eves but what we all believe in, and the only thing that I possibly might say at all or add would be a brief comment or two on the suggestions he has made. One thing I have in mind is this, and I think it is very pertinent just at this time. We are one year away from a legislature and one year ahead of a legislature, and I want to call attention to a case that came up in Ohio, where a lack of care in looking after an appliance, purchased by a man the year after he became a member of the Legislalature, resulted in his proposing a gas bill when he went into the Legislature that was very inimical to the gas interests. He admitted that was true. If the tact and courtesy and attention necessary to the proper care of his appliances had been given that man would never in all probability have felt as he did toward the gas interests nor have taken the course he did a little later on. A very prominent business man in an Ohio city said, in talking to me the other day, "We have just a little bit revised our ideas about selling gas. We have concluded that the thing to talk among our employees, among our selling men, from this time on, is that this company is selling service." The more I have thought over that expression the deeper it has sunk in. Mr. Eves has struck the same point. If we sell service along with our gas we are going to make it much easier, in my judgment, for new business men to work, we are going to add to the benefit they all have in the low price of this commodity against the very greatly increased price of other commodities. A point in the President's paper covers the same thing. He speaks about the price of gas in 1890 being higher than it is to-day. I saw a statement in a financial paper the other day that the price of commodities had increased 33⅓ per cent., while the price of gas has been reduced rather than increased. I mention that in passing. Mr. Eves speaks in the paper of another thing, the imaginary complaints of the consumers, and in that connection I think his remarks were very well taken. A consumer to us has an imaginary complaint; to himself that complaint is as real and genuine as is our knowledge that he is in the wrong, and consequently I think it devolves upon our business men, in the interest of securing this new business, to make it a point to see that every one of these grievances is immediately looked after. I think the company can add to the efficiency of their selling force by having an up-to-date complaint department. It has only been 4 or 5 weeks since the *Saturday Evening Post* published 2 or 3 articles along the same line, of the advantage to public service corporations of the immediate handling of complaints, even going so far, I think, as to intimate that if the company could send a man immediately to look after the complaint it would give the customer more satisfaction and leave the company in better shape than would deferred action, giving the consumer everything he wants. I thoroughly appreciated the paper and feel that Mr. Eves has pumped us all full of gas with new selling ideas.

Mr. Dolley—It is a very difficult thing for an ordinary gas man to improve very much on that paper. However, there are a few points I think could be made a little more forcible. One is, the appearance of the solicitor and of the men who follow the solicitor on the work. Of course, we all agree that the solicitor should be a man of good appearance, a man that does not talk too much, but who talks just enough. The man that follows him up sometimes spoils the good work that the solicitor has done, and I think it is just as necessary for him to appear well as for the solicitor. Of course, we do not expect him to wear a white collar and cuffs, but his overalls should be clean. I think it is a very important feature that the man installing the appliances should have some knowledge of the working of the appliances. It should be impressed on the fitter that it is not only necessary for him to connect up that appliance and leave it, but it is necessary that he should see that the appliance is working properly. Of course, if we go down the line, there is the wagon of the company. I think it should be kept up in proper shape and also the foreman of the wagon, the man taking the appliances in the house. I have noticed lots of times that the fitter and the wagon man would be very careless in installing appliances into a house, a stove for instance. The wagon man and the fitter take the stove into the house and probably mark the wookwork or the floor or something of that kind. They should be more careful in handling stoves. I think the company should see that not only the solicitors are in proper shape but also the fitters and the wagon men. And next, coming to the office, I think it should be brought out very forcibly that when the customer comes to the office he should find it a well lighted and attractive place. If a customer has a appliance installed in his house, and it is working satisfactorily and he is satisfied with it and he comes into the office not neat and attractive and dimly lighted, he loses some of the confidence he had in the company, and also the force at the office should be careful of their appearance. All the way down the line from the solicitors to the office force, I think the managers of the company should see that they are in harmony and work together.

Mr. Ott—I think that Mr. Eves has given us an excellent paper, and has said a great deal on the subject of improved methods of selling appliances. There is one thing about his paper that struck me very forcibly and that is the idea of a square deal. I think really the keynote of the situation is right there. The square deal means to do by the other fellow as you would like to have him do to you if you were in the same place. If we treat our customer well and install the right fixtures and appliances, we certainly have made him a friend and it will do more advertising for us than all the solicitors we can send out. Suppose a solicitor had gone to a store to figure with a man upon lighting his place of business. He looks through the building and considers the amount of light it would take and so forth, and says a set of our fixtures would light this up very nicely and those fixtures would contain possibly 25 burners, consuming 4 feet of gas to the burner, and that would be 100 feet of gas for the entire set of fixtures per hour. If they were getting a dollar rate for gas that would show the cost to that man for lighting his building. It might be satisfactory to the man, but on the other hand, the solicitor knows that we have got the inverted lamp which gives more light for less gas, but he figures that 25 inverted burners could be installed at 3 feet per burner, or 75 feet of gas per hour and that there is a loss of 25 feet per hour to the gas company, or ¼ of the income from this customer. Now isn't it better for the salesman to install the inverted light and take the 75 feet of gas an hour and give the customer the best of satisfaction, knowing that no electric company is going to come in there and undermine you with lower bids or better light? I think that there is where the square deal comes in. If you were the merchant you would want the best light for the least money. In reference to instruction in the use of gas appliances already set. I think we must not lose sight of the fact that we may give too much instruction. For instance, in our smaller gas plants the manufacturer, the superintendent, the man on the ground, has got to be salesman and the whole thing, nearly. I instruct our customers like this: "Now if a quart of water will do your work, do not put 2 or 3 quarts in and fill your tea kettle and boil it all; use what you want and set the rest away to cool; there is a loss." It will be more satisfactory to the gas company, provided they pay their bills and are satisfied. Another thing in boiling potatoes, get your water to the boiling point and then turn down the gas. It takes only a certain amount of heat to boil the water and the rest of the gas goes up in steam. The consumer has had no value from the heat that has gone up in steam. Teach them to use the sub-burners. If you can get their bills down, they will be satisfied and tell the neighbors and help you more in selling than all the talk you can give.

Mr. Rowland—I wish to take this opportunity to express to Mr. Eves personally my deep interest in the paper that was presented to this Association. I consider this a very valuable record and am glad to know that it will be published. Our Association is one that consists of a great many small companies which do not have all the advantages that the larger companies get from their well organized department business. The manufacturer's duties are manifold. He has to take care of the distribution, the sales and the new business end of it. I appreciate fully the truth that a gas company often suffers from the lack of attention of its managers to the proper training

of its employees, from the wagon drivers, if the company affords such a thing, up to the fitters and on into the office. We all appreciate the value of the goodwill; that is one of the valuable assets of a manufacturer, but he overlooks those little things that undermine that goodwill. This paper I consider would be a valuable thing to have on the desk and constantly before each manufacturer as a reminder to look into those various departments and see that they are in good running shape. The offer of Mr. Graf to train lady solicitors is one that I think should be highly appreciated. It is a very valuable suggestion to gas manufacturers. Many of us cannot afford to employ a trained professional lady for the gas business, but we all of us, possibly, know of people in our own community who could be developed into valuable salesladies. I consider that it would be a vast help to anyone. I wish to personally thank Mr. Graf and Mr. Eves, and the Indianapolis Gas Company, for the opportunity they afford to the Indiana gas companies.

The President—We will now have a few words from Mr. Kellum, and inasmuch as the hour is approaching for adjournment and as we are to reassemble here at 2:30, I would suggest that we continue the discussion of Mr. Eves' paper upon resuming our session this afternoon.

Mr. Kellum—When I heard Mr. Eves paper just now was the first opportunity I have had to learn its contents. Every paper I have heard read by Mr. Eves has impressed me particularly with one point, and that is that they have always had something new in them. Now, in devising schemes for new business it has always been Mr. Eves' strong point to systematize the work, and his papers dwell quite a little on system, but his modesty prevents him from dwelling on the most essential feature, and that is supervision of the work after the system has been devised and is in operation. The system don't mean much if it is allowed to run itself, and I attribute Mr. Eves' versatility very largely to the supervision he gives the work of his men continually. New problems are coming up all the time which have to be solved, and one thing leads to another, the solution of one problem making a basis for the development of a new idea. I have nothing especial to say on the paper in detail. Of course, it is with the lighting end of the business that it is most vitally concerned, but I think the same principles apply to the lighting end of a gas company's business that apply to the general system. I think Mr. Eves is particularly happy in his policy of closely supervising his men and of profiting by the work of those men himself.

The President—We will now adjourn until 2:30 P.M.

First Day—Afternoon Session.

The President—Members of the Indiana Gas Association will come to order. The Secretary will read the appointment of committees.

The Secretary—The following committees have been appointed:

Nominating Committee—D. A. Barnes, Chairman; G. G. Atkinson, D. Beers, A. B. Davis, A. G. Pickens.

Committee on Place of Next Meeting—J. M. Ott, Chairman; A. Rochat, J. A. Perkins.

Committee on Offer to Instruct Demonstrators—D. A. Barnes, S. E. Mulholland, J. M. Ott.

The President—We will now resume the consideration of the paper by Mr. Eves. The meeting is in your hands. We would be pleased to have this discussion continued.

Mr. Travers—I have not very much to offer on Mr. Eves' paper, as I am in contact with Mr. Eves every day. I work under Mr. Eves, and I have an opportunity to appreciate the value of his experience. I think that paper is one of the finest papers I ever listened to in that line.

Mr. Cooke—I think Mr. Eves has covered the subject. He outlines what a gas company should be and what it should do. I am free to admit that I can think of nothing he has not included in his very complete paper.

The President—Has anyone else anything to offer? If not, I will declare the discussion of Mr. Eves' paper ended. I am sure I voice the sentiments of the Association when I say we are very grateful to you, Mr. Eves, and thank you for having contributed this paper on modern methods of selling gas. I think you all will agree with me that Mr. Eves is quite competent in anything on this line. His frequent contributions have everywhere been met with much commendation. The next paper is

ANALYTICAL WORK ON RAW MATERIALS AND COAL TAR BY-PRODUCTS,

by Mr. A. B. Davis, of Indianapolis, Ind.

In the last year I have received a number of inquiries and have done considerable analytical work for outside companies, an account of which I believe will prove interesting to the Association.

Two of the inquiries were questions as to what was best to use for the purpose of odorizing air or gas to be used in testing out new or old mains for leaks. Ether and chloroform are both used for this purpose, as is also carbon disulphide and occasionally strong aqua ammonia. The aqua ammonia is probably the best of the lot, since ether is explosive, carbon disulphide, under conditions which are proper, will ignite spontaneously and chloroform does not give an intense odor when highly diluted with air or gas. I would call your attention to the compound used in Germany for odorizing blue water gas. In that country, where great quantities of blue gas are used for fuel, the law requires that it be given a distinct odor, and this is done with phenyl carbamine, or another name for it which is just as proper, phenyl isocyanide. It is prepared by warming a mixture of aniline oil, chloroform and alcoholic potash. When the three constituents are mixed a violent reaction takes place and the resulting compound has on extremely powerful and rapidly disseminating odor, which, in the concentrated state, is almost unbearable, but when highly diluted with air is only slightly unpleasant. The odor is very characteristic, and so powerful that a single drop of the compound exposed to the air in a large room will give the air its characteristic odor for days. The compound is not on the market, and must be prepared by the parties who wish to use it. The preparation is simple. The work it does is excellent, and a mixture of air and the vapor of this compound is neither explosive or dangerous in any way, since only very small quantities are necessary.

Three of the letters of inquiry concerned naphthaline and its removal from the mains. The question is so old that it seems impossible to add anything to what has aleady been said concerning this subject. I would like to say, however, that one of the most important points in the removal of naphthaline from the mains by means of a solvent is that after the solvent has been run in, or vaporized into the mains and done its work, that the solution of naphthaline in the solvent which may settle out should be run to a drip and pumped out of the mains entirely. If all of the solution of naphthaline in the solvent be not pumped out of the mains, the solvent soon evaporates, leaving the naphthaline in the crystaline state again ready to sublime and form a blockage. An experiment in our laboratory shows that a service pipe may be completely blocked by one-fourth ounce of naphthaline, or that a single pound is capable according to this ratio of blocking 64 services. Probably the most powerful solvent of naphthaline on the market is that so-called naphthaline solvent of the Semet-Solvay Company.

Naphthaline in the pure state melts at 79.5° C., boils at 213° C., and sublimes slowly if exposed to the air even at ordinary temperature. It will dissolve more or less in almost all of the ordinary organic solvents such as benzine (coal tar), gasoline, ether, alcohol, chloroform, carbon tetrachloride, etc. The most powerful solvents of all are the coal tar light oil, boiling between 110° and 200° C. The constituents of this oil are principally toluene, xylene, mestiline, cumidene and tetramethyl benzene, certain mixtures of these oils being capable of holding as high as 28 per cent. of naphthaline in solution. A well known naphthaline solvent on the market consists largely of this mixture. Steam is about the most useless method of handling naphthaline, for although the steam will melt out the blockage at the point where the steam is applied, it only tends to drive the naphthaline from place to place in the mains, and the heat of the steam actually aids the naphthaline in subliming and producing a blockage further on.

In the past year I have analyzed about 15 samples of boiler water for gas companies in the State, and about 35 samples for other companies outside of the State. This shows that boiler scale and the question of proper treatment for boiler water is a continual source of trouble among gas companies generally. It is practically impossible to obtain a good boiler compound on the market at a reasonable price, since nearly all companies manufacturing boiler compound have had to expend such large sums in selling their produce that the cost of the compound to the consumer is often 6 times the cost of the material to the manufacturer of the compound. For this reason I would call attention to the apparatus on the market which when attached to a boiler acts as a skimmer, continually skimming the precipitated solids from the surface of the water in the boiler, filtering them out by means of a stone filter and returning the filtered water automatically to the boiler by means of an injector. The percipitation of the solid is effected by means of nothing but soda ash or a mixture of soda ash and caustic soda, or in some cases, where the

principal scale forming salt in solution is calcium carbonate, merely by the aid of heat. A very excellent apparatus of this type can be obtained at a reasonable charge from the H. B. Heywood Co., of this city. I have known an apparatus of this type to handle water containing 85 grains per gallon of sulphate of magnesia, the water being from a coal mine, and of such a nature that it would have been practically impossible to handle with any boiler compound. The apparatus is not expensive when you consider that it saves from 25 per cent. to 100 per cent. of the boiler compound bill, that it is not subject to material deterioration and almost the sole cost is that of initial installation.

Two inquiries during the year were concerning the drainage from small works running into streams nearby or passing through the town, the people making strenuous objection to the odor of sulphur and tar, and also complaining that it killed fish. In this connection I might mention a case in the South where a similar complaint was made, and the gas company by analysis of the water before and after the drainage had been run in were readily able to prove in court that the water of the stream was actually in a far better condition from a sanitary point of view after the drainage had been run in than before; that is, the ammonia and tar acids had acted as an antiseptic to kill germ life and deodorize decaying organic matter. There was no further objection thereafter, and I see no reason why nearly every case of this character against gas companies, if properly taken up, could not be brought to a similar conclusion.

About 25 coal samples subjected to an analysis during the year gave rather strange results on some occasions, due to the carelessness with which samples had been taken. One sample of coal received was in a 1-gallon oil can, the lid of which had been carefully soldered on in order that the sample might reach the laboratory without loss of moisture. On opening the sample there appeared on top a lump of slate nearly the size of an egg. The lump of slate was taken out and ground separately from the rest of the sample and two analyses made, one before the slate was added and one after the slate had been added and carefully mixed with the rest of the sample. The analysis before the slate was added gave 6 per cent. ash, and after being added 17.5 per cent. ash. Neither analysis could mean anything to the people sending in the sample, since the sample certainly did not represent the coal from which it was taken. A descriptive method for the sampling of coal may be found in almost any elementary book on gas subjects, as well as in the paper which I read before the Association last year. If a sample does not represent the car, train load or mine of coal, an analysis is worthless and is nothing more than a guess. The proper sampling of coal has generally proven so difficult that a commission has been appointed by the Coal Miners' Association to go over the methods and determine which is the most satisfactory of those in common use, working on the principle that analyses of samples, all of which are taken in the same manner, will be relatively correct.

Gas men probably come in contact with and handle more coal tar than any other body of men, and the question continually arises that since this great quantity of coal tar is available, why do we not work up this raw material into products of greater value, such as coal tar dyes, medical compounds derived from coal tar bases, etc. I have here about 20 compounds separated from coal tar or derived from bases separated therefrom, and after going over briefly their method of manufacture, will try to prepare a few coal tar dyes, after which I believe it will be obvious that the reason gas companies do not work up their coal tar is on account of the large amount of apparatus necessary and the amount of cheap skilled labor required.

Let us start with the fractionation of coal tar. First we obtain creosote oil and pitch, the latter not being further worked up. The creosote oil on refractionation in a still yields benzene, toluene, xylene, cumidene, naphthaline and anthracene, from these hydrocarbons derivitives are prepared which yield nearly all of the coal tar dyes. If we start with benzene and treat it with nitrosulphuric acid we obtain nitrobenzene, which when treated with iron and hydrochloric acid is reduced by the liberated hydrogen gas to aniline oil, which, while not a dye in itself, enters into combination with other compounds to produce thousands of dyes of every shade. Aniline oil under proper conditions, if treated with nitric acid, yields to new compounds, ortho and para nitraniline. If we start now with paranitraniline and dissolve it in hydrochloric acid and add to this solution a molecular proportion of sodium nitrite, we obtain a solution of paranitrodiazo benzene chloride, which if poured into a solution of betanaphthol in caustic potash yields a compound which is a dye and is largely used. It is on the market under the name of para red. Similarly if a solution of metanitraline be treated with hydrochloric acid, and sodium nitrite and the resulting solution poured into a solution of alphanaphtol, dyes of the blue-red shades are obtained. Dyes of this character are spoken of commonly as azo dyes. If aniline and toluidine be mixed and heated with oxidizing agent, such as arsenic acid or nitrobenzol, the famous series of rosanilines are produced. They are known as the triphenylmethane series. If we heat naphthaline with sulphuric acid in the presence of a mercury salt phthalic anhydride is obtained and this readily enters into combination with carbolic acid to produce phenolphthalein. Similarly it enters into combination with resorcin to produce fluoriscene, which when bromidated yields valuable silk dyes known as the eosines. I believe that the illustrations of the manufacturing processes given have shown that a very large amount of labor and apparatus is necessary for the successful manufacture of dyes, and the reason why gas companies do not work their coal tar up in this manner is obvious.

Discussion.

The President—Gentlemen, it is not doing Mr. Davis any injustice to say that probably some of us have been entertained a little bit more than we have been instructed, but this can be gathered from the lecture—the possibilities to be attained in our respective gas works by such service as can be rendered by Mr. Davis or some other competent chemist. There are questions daily arising that we must cope with and upon which success is finally reached by persistent observation and by using three or four gas works' methods of arriving at some conclusion as to what is the right thing to do. But there are many problems that arise in the course of the year that we cannot cope with because we are not equipped to carry out the investigation that is necessary, and under those circumstances, we can save much time and money, and give much better service by having someone visit us and investigate and tell us the cause of the trouble and suggest the remedy whereby the difficulty may be overcome. The possibility of the great assistance that Mr. Davis or some other chemist can render to us is to-day suggested by his lecture, which you all have appreciated, and I know that with you as with me, his lecture was too short. Now, gentlemen, we will be pleased to have you comment on Mr. Davis' lecture, and perhaps, by some suggestion you may have to offer, you can give us additional thoughts of value. The meeting is in your hands.

Mr. Thwing—I do not feel competent to discuss the lecture that has been given by Mr. Davis here, because he has gone into realms that are away beyond the point at which I stopped when I was doing a little chemical work in an amateurish way. There was one point I took a note of, and that was his statement that gas house drainage was beneficial to streams. I think there is no doubt that the drainage is beneficial as far as removing bacteria is concerned. I remember some years ago that Mr. Thomas D. Miller, of New Orleans, had a controversy with the State Game Commission, I believe it was, on account of the fact that the fish in Lake Pontchartrain were dying rapidly. The game commission blamed the mortality among the fish to the fact that the drainage of the gas company emptied into the lake. Mr. Miller had a chemist at his command and they investigated and found out that the fish were killed by a parasite that had appeared in the lake and that in the neighborhood of the drainage the fish were all well, healthy and hearty. At the same time I remember an experience in St. Louis where a man working at one of our stations caught some fish. We were on the bank of the river and we emptied our drainage indiscriminately into the Mississippi, water gas, coal gas and everything else. This man set out some nets opposite the gas works and he got some of the finest and fattest fish I ever saw in my life. He gave me one and I took it home and it was cooked and we tried to eat it, but we couldn't, it tasted too much of tar. [Laughter.]

The President—I don't know the names of everyone present. I wish that you would please take part in the discussion. We would like to hear from every one of you.

Mr. Dykeman—I would like to ask Mr. Davis a question in reference to that naphthaline solvent. On the recommendation of Mr. Dunbar two years ago I got in a case of it; with his specific directions as to its use I found it entirely satisfactory. The directions were to put it in certain distances from the drips and then, after a brief period or a certain time, to go back and drain the drip, and I found it very satisfactory. Whether it was due to the naphthaline solvent or whether it was due to the fact that the works were not sending out naphthaline I do not know, but we were practically free from it. If I am in error I would like to be put right by Mr. Davis. That is a subject I think we can all talk about, the elimination or prevention of naphthaline

in our mains. The next season I was advised to try another scheme, which I did, and my naphthaline complaints were considerably more than they were that season. Now, when Mr. Davis brought that subject up, the thought flashed on me, "I will get another case of that naphthaline solvent." I would like to hear from somebody else on that subject.

Mr. Davis—As I understand that question, you want to know why you had the trouble with naphthaline?

Mr. Dykeman—Why, we didn't.

Mr. Davis—You had no trouble the year you were using the naphthaline solvent, and the next year you did have trouble. Were you using it then?

Mr. Dykeman—No, we were not using it then.

Mr. Davis—I would take it from the face of it, that if you had no trouble with naphthaline the year you were using the naphthaline solvent, the reason you had trouble with it the next year was because you were not then using the solvent.

Mr. Dykeman—I said perhaps we were not sending out any volume of air from the works.

Mr. Davis—I couldn't say about that. I don't know the condition of your works.

Mr. Dykeman—Is it your recommendation that the naphthaline solvent is the cure for that evil above all other methods?

Mr. Davis—That is my recommendation provided there is no way of stopping the naphthaline in your works, because the naphthaline solvent sent out by the Semet-Solvay Company, I know, is the most powerful solvent for naphthaline on the market. It is even more powerful than benzol, it is more powerful than gasoline, alcohol, or anything I know of.

Mr. Dykeman—I used it over and over until eventually it was gone.

Mr. Davis—The chances are, if you used it over and over, the first time you put a barrel of that solvent in your mains it took up 10 pounds of naphthaline, which it held, and then you pumped it back into your mains and it took up say 10 pounds more naphthaline, making 20 pounds now in it, and eventually the naphthaline solvent was almost evaporated by the gas, and you had the original naphthaline, or a large part of it, back in your mains again.

Mr. Dykeman—I put it in such a position that it ran off with the dirty water and carried the naphthaline with it in solution. Then we pumped it out and the naphthaline went with it and eventually disappeared.

Mr. Davis—Do I understand that when you pumped the solvent out of the drip you put it in a barrel, perhaps, and pumped it back into the main again?

Mr. Dykeman—Yes.

Mr. Davis—That is the point I make. When you pumped it out you had a good deal of naphthaline in solution. When you pumped that solvent that you had reduced once back into your main you put most of the naphthaline which you had taken out back into the main. When your solvent was all evaporated a large part of the naphthaline was back in the main.

Mr. Dykeman—Now, the directions from the solvent people were that you could use this solvent over and over.

Mr. Davis—I should say that those directions were very unwisely given. You can readily see that if you dissolve a pound of salt in a gallon bottle of water and pour the salt solution out of the bottle, and then back in, it would still have that pound of salt in the bottom of the bottle. And so, if you had 25 pounds of naphthaline in your main and dissolved it by the solvent and pumped it out of the drip and the naphthaline was in solution, and then you pumped that solvent back into your main, you pumped the 25 pounds of naphthaline n with it, and I say any company that gives any directions of that kind, is giving unwise directions.

The President—Wasn't the suggestion to use it up to the point of saturation?

Mr. Dykeman—There was nothing said about the point of saturation in the letter of directions at all. It was simply a case of trial on my part, and I want to get this question of treatment threshed out, so that it can be a matter of fact and not a matter of experiment.

Mr. Walsh—What is the cause of the bi-sulphite of carbon you find in some coals? What causes it in some coals and not in others?

Mr. Davis—The question is asked, "What is canbon disulphide?" I can answer this best by a description of its manufacture. Clay retorts usually about 2 feet in diameter and 7 or 8 feet high are filled with charcoal and then heated to a good red heat. Sulphur is then fed in through a pipe which reaches to the bottom. The sulphur vaporizes and combines with the hot charcoal to produce carbon disulphide—CS_2. This is drawn off in the form of a vapor and condensed. Theoretically we should expect to find carbon disulphide in gas since the coal contains sulphur and there is always plenty of carbon present, in fact, from a theoretical point of view, it is rather surprising that we do not find more than the usual 7 to 10 grains per 100 feet of gas.

Mr. Thwing—This matter of the naphthaline solvent - I know I am treading on dangerous ground - but my idea of naphthaline solvent is not exactly the same as Mr. Davis' is. I have had the impression that a naphthaline solvent that is used successfully for the prevention of naphthaline in gas distribution is a solvent that is a vapor under ordinary conditions that will dissolve the naphthaline vapor and in doing so would relieve the vapor tension and allow the naphthaline to be carried through the burner without being deposited. We all know that when vapors or gases which are not solvent on each other are placed in a pipe, or in a receptacle, that the vapor tension is equal to the combination, is equal to the sum of the vapor tension of each of the constituents; but when you have one vapor or gas that is solvent in the other, an entirely different condition takes place and vapor tension is reduced. Now, this naphthaline solvent, I believe, will dissolve or will unite with the naphthaline in the gas and carry it forward to the burner and prevent it from depositing. There also may be a precipitation of this solvent in the pipes that would pick up naphthaline that had already been deposited in the pipes and carry it to the drips, or the low point. In carrying it the naphthaline would be pumped away with the solvent. I do not know about this particular solvent, but I suppose it is capable of vaporizing in order to carry off the naphthaline. My experience with naphthaline is that after it has once been in solution it does not vaporize again, but if you vaporize the salt, boil it off or allow it to vaporize, the naphthaline is left behind in a solid state. Therefore, I believe—I say I am treading on dangerous ground, because it is largely a theory with me at the present time—I believe the solvent would go forward practically pure and would not carry the dissolved naphthaline with it. My experience in dissolving naphthaline, putting it in solution and then removing the solvent, is that the naphthaline is left behind in solid form.

Mr. Danforth—I should like to ask Mr. Davis in regard to the comparative cost of gasoline and the solvent for naphthaline and the comparative efficiency of the two.

Mr. Davis—I can only give you this comparatively. This solvent will carry about 25 per cent. of its weight, while gasoline will only carry about 7 per cent. The comparative cost would be as 4 times the cost of gasoline to the cost of naphthaline solvent. If gasoline costs 10 cents a gallon and naphthaline solvent costs 10 cents, the ratio it as one fourth.

The President - Mr. Davis, you told us, much to our gratification, that your gas works' sewerage, run into the creek, would purify that stream to an extent and kill the bacteria that might be in there and make the water, as far as any nuisance might be concerned, better for the community than it was before. Now, suppose that you would have a complaint come of the water from the gas works' sewerage, discoloring the paint on the houses through whose neighborhood it flowed, making them of leaden hue, how would you take care of that?

Mr Davis—I would tell them to paint their houses with something that would not discolor.

The President—What would you recommend?

Mr. Davis—Any sulphide paint. You see, since it is sulphur that discolors the paint, any sulphide pigment would remedy the trouble. No matter how much sulphur there was in contact with it, it would not turn black. If they would paint their houses with a sulphide pigment it would not discolor.

The President—Is there any brand of sulphide you can recommend?

Mr. Davis—I can only tell you of some of the late pigments. Zinc sulphide is one. There are various sulphides, and they are inexpensive, on the market. There is a sulphide of iron and nickel. I believe there are dark green sulphides. There are also compounds that sulphur will not attack. It is only a question of getting a pigment that sulphur will not attack. If a man uses white lead on his house, of course it will turn dark as soon as the sulphur hits it.

Mr. Beers—In reference to the question of gas sewage purifying streams, there was a very complicated case that I knew of. Evidence was brought in to show that the sewage of a gas works flowed into the stream, as well as sewage from other factories or works, along with the ordinary sewage from the city. Now, the gas company had their chemists up and their chemists managed to get evidence in that showed, as Mr. Davis has stated, that their sewage did not hurt the

stream any. They even got some farmer evidence in. The farmers were ready to swear that their stock preferred the water after it had passed the gas works and received the sewage from the gas works rather than to take it before. [Laughter.]

The President—This is a new thought suggested. We would like to have further elucidation.

Mr. Pickens—I regret very much that I am not able to discuss Mr. Davis' talk, but I would like to emphasize the invitation he extended to the gas men of Indiana to attend this lecture of Dr. Miner. It will be a lecture that will be well worth the time and attention of any man. Dr. Miner is the expert chemist of the Welsbach Company and is fitted to tell us many new and interesting things.

The President—Is there anything further, gentlemen? If there is nothing further on the lecture by Mr. Davis it would be eminently proper for some one to move a vote of thanks.

A Member—I move that we extend to Mr. Davis a vote of thanks. [Seconded.]

The President—It is moved and seconded that a vote of thanks be extended to Mr. Davis for a very interesting lecture. All in favor of the motion may signify it by saying Aye. Those opposed, No. [Carried.]

A Member—For the benefit of one gas company, the Indiana Lighting Company, of which Mr. Murdock, of Lafayette, is General Manager, I wish to extend an additional personal vote of thanks to Mr. Davis for some difficulties he has helped us out of this last year. [Seconded.]

The President—All in favor of the motion to extend a vote of thanks from the Indiana Lighting Company to Mr. Davis may signify it by saying Aye. Contrary, No. [Carried.]

Mr. Graf—I think it is a point to consider whether we want all this discussion to be officially printed in the proceeeings. I think the Secretary ought to be authorized to go through the record and cut out all superfluous matter.

The President—What is your pleasure in reference to the suggestion of Mr. Graf. I think most of it ought to go into the printed proceedings, but that is for you to say.

Mr. Dykeman—I think as these proceedings go out to the world and we will be judged by the report as it reads, I think, perhaps, the facetious matter had better be eliminated.

The President—It is said that all work and no play makes Jack a dull boy. I think a little facetious matter gives evidence of qualities that show we are able to take care of our business. I think that can safely be left to our Secretary and Mr. Graf.

The Secretary—Our proceedings were printed last year and it was decided that all members should receive a copy free of charge and that additional copies might be obtained for 75 cents. I am now authorized to say there are a few copies left of last year's proceedings that probably some of the newer members would like to have. They will be here at 50 cents a copy.

The President—Is there anything further? We will assemble promptly to-morrow morning at 10 o'clock. I wish to call attention to an address by Mr. Dowling. He is a native of my own city and has recently served as a member of the Railroad Commission of Indiana, having this year resigned his position to enter into the practice of his profession. He is a very eloquent, capable gentleman, and it would give me personal pleasure to have as many of you present to-morrow at 12 o'clock as possible. The hour set for his lecture is the time he finds it most convenient to attend. I certainly hope we may have a very large audience present to meet Mr. Dowling. Gentlemen, is there anything further? If not, a motion to adjourn is in order.

A Member—Mr. President, I move we adjourn. [Seconded.]

The President—It has been moved and seconded that we adjourn until to-morrow morning at 10 o'clock. All in favor of the motion say Aye. Contrary, No. [Carried.]

SECOND DAY—MORNING SESSION.

The President—The first thing on this morning's programme is the reading of a paper on

THE GAS ARC,

by Mr. D. A. Barnes.

In store and factory lighting, the gas arc is still the leading factor. The inverted type of arcs has come into the lighting field, which we welcome. The tungsten lamp at present is strongly advertised as a money saver over other electric installations. At present it has entered into strong competition with gas illumination. Therefore we must be on the alert and give the merchant more light with an ornamental installation of gas lights. As a compartive cost between gas and electricity, it is safe to say that in most cases electricity costs about twice as much as gas for the same amount of light. Therefore we have the advantage of costs. The talking point of the electric salesman against our method of lighting is heat and inconvenience, also ornamentation. In the gas arc (especially the inverted type) we have a worthy competitor against any electric installation.

The question now arises, which is the best method in which to put out the arcs; shall we sell them outright, or shall we rent them. I am in favor of selling them outright, at a profit, and my argument has been this, that if a customer has an investment in the arcs, he rarely discontinues their use, that is if the lights are properly maintained. If they are on rental, he has no investment, and can more easily be persuaded to at least try some other method of lights.

The argument in favor of the rental plan are that the arc is in control of the company at all times and, therefore, would have better attention, and that eventually the consumer pays for the arc and you are still master of the situation, and that you can get more arcs into service.

The maintenance of the arc is of great importance. I do not think it wise to sell an arc and not get a maintenance contract at the same time, and in my experience there is rarely a case where a maintenance contract cannot be secured at the time of the sale.

In conclusion I wish to say that in my experience a customer using gas arcs and maintained by the company rarely complains, and is a good consumer, so it behooves us to take as much interest in selling arcs as in selling gas ranges.

I wish to thank you for your attention.

Discussion.

The President—I will call on Mr. MacNab.

Mr. MacNab—Mr. Barnes says we have the advantage of cost. We would say we also have the advantage of convenience and ornamentation. We will let the electric salesman have the heat. The City Market and Tomlinson Hall were formerly illuminated by electric arc lamps, and it cost from $6,000 to $7,000 per year. Two years ago we got permission from the Board of Public Safety to place 31 gas arc lamps in the section of the City Market on 60 days approval and guarantee a saving. These were put in against 17 electric arcs. The gas arcs give a much better illumination and made quite a saving in the 2 months, and the city accepted the lamps. Then our competitors, the two electric companies, got very busy and made the city some flattering propositions, one of which was to take the gas lamps off their hands and place 100-watt tungsten lamps throughout the City Market. The Board of Public Safety gave one of the companies the privilege of equipping a section of the Market with fifty-eight 100-watt tungsten lamps. The illumination was not satisfactory. In 2 months' time the tungsten lamps lost considerable of their brilliancy. Although everything was in our favor, it was several months before we secured a contract to place gas arcs throughout the Market. We have two pictures which we have taken to show the comparison of illumination and which were a great assistance in securing the contract. We have installed 175 gas arcs and about 125 Reflex throughout the City Market and Tomlinson Hall. At the time these lamps were installed the city had a 5 cent rate on electric and 90 cent gas. In taking the contract to illuminate Tomlinson Hall, which is 75 by 200 feet with 40-foot ceiling, it was necessary to control the lighting of the gas arc lamps from a given point. This we arranged on an independent pilot line and is controlled from the stage We used the jump spark system on the balcony lights, which is also controlled from the stage. We would like to state that it is now possible to secure fixtures, either in gas or combination, equally as attractive as the electric fixtures and arranged with a central key for lighting the gas.

The President—Mr. Barnes' paper is open for discussion. We would be pleased to have you take an interest this morning and show it by voluntarily getting up and saying something.

Mr. Dykeman—There are several questions I would like to ask. I don't like to be on the floor so often, but I want to ask this. In installing your arc lamps where you have found the gas fixtures already installed and the gas piping, what has been your custom? For instance, the plumbers as a rule do not conform to the letter of the law in piping stores and halls according to the rules of house piping. Their idea is to get in as small piping as they can possibly get in. Now we know that an arc light carries more gas than any other kind, consequently if we put an arc light on this pipe we are going to get insufficient gas to that lamp. Is it your custom to repipe, to remodel, or is it your custom to put the uprights on the already installed pipe again? What is your custom of maintenance? How do you keep track of your trimmers? What method have you for their reports?

The President—Is there any further discussion, gentlemen? Mr. Blank have you anything to offer?

Mr. Blank—No, sir.

Mr. Ridenour—I think one of the most valuable experiences we have ever had in our competition with the old electric arc lamp is that our arc lights give a better distribution of light. The old arc lamp gives an intense light, but it is not properly distributed. The arc lamp, even the upright lamp, met this condition to a certain extent. And it was no effort to get the business and hold it because we were able to have a better distribution of light. Then the tungsten people brought out their fixture, but I do not think we have anything to fear from that. You have the strongest argument to win out that can be placed before any business man, namely that of cost. His whole training and endeavor has been to buy good goods in the cheapest market possible, and if you can demonstrate to him that you can furnish him good illumination for one-half the cost that the electric people can, you have successfully met the tungsten competition. It has been demonstrated by competent engineers of the

Welsbach Campany that the light distribution from a fixture equipped with four 60-watt tungsten lamps with the holaplane reflectors, is far below the light given by an equal number of inverted burners with the same reflectors. If the gas costs $1 per 1,000 feet, and electricity is figured at 10 cents per killowatt, it has been found that the inverted fixture was giving three times as much illumination for the same month. I refer to this type of fixture simply to call your attention to its great efficiency as regards gas consumption in fighting active tungsten competition. The inverted gas arc is probably the most economical for the gas company, and even with its use we have the tungsten beat two to one as regards cost of operation, as Mr. Barnes has stated in his paper. Whichever type of lamp that we use, we can give them better light for less money, and why should we not get the business. The only argument that they have to stand on is that of heat, and if the room is properly ventilated, that cannot be a serious objection to the use of either the arc or the inverted burner. One thing that we must get away from is the idea that to secure this business we must install and maintain these lamps free of all charge. You never heard of the tungsten people doing this. We simply weaken ourselves in so doing, for it makes it easy for customer to later order the gas fixture out while if he owned them he would hesitate to do so.

The President—Mr. Barnes has condensed a great deal of thought in a small amount of expression. I think he has fully covered the ground with reference to the installation of gas arcs. He has two conceptions of the conditions, it seems to me, under which they should be put out among our consumers. He is in favor of selling outright instead of renting them. I think this plan should prevail even in companies where there is a combined gas and electric plant. In the strenuousness of competition between the two lights, even where operated by the same company, sometimes in order to make an appearance of show they switch off from gas to electric, or from electric to gas, but there seems to be a fascination about the selling of electricity, and my observation has led me to believe that with an electric and gas company combined they seem to prefer the electric end of it, so as representatives of the gas department of a public service corporation, it seems to me, we should use our endeavors when gas arcs are installed to have them sold. When sold and in operation they will in all probability remain; in fact, they will if the proper maintenance is looked after. I favor Mr. Barnes' idea of taking a maintenance contract at the time you sell the gas arc. In that, as in every other department of business, it is the maintenance and service that counts, and by having the maintenance provided for, there is no reason why a gas arc when once installed should not remain there indefinitely, except it be supplanted by a gas arc of a newer pattern and design. There is no question of the cheapness of gas for illumination. Mr. MacNab has just told us that a gas arc would give twice the amount of light for a dollar that an electric arc would or the tungsten lamp. The maintenance charge is but one-third. I believe we should all be enthusiastic on the subject of the introduction and maintenance of gas arcs. Mr. MacNab has told us that there is now a fixture upon the market that is a combination of gas and electric fixture which gives the gas an equal show with the electricity. I should like to have Mr. MacNab give us some further information on that subject. It seems to me there are very few combination fixtures that are suitable for the burning of gas.

Mr. MacNab—These fixtures are made by the Welsbach Company. They are not carried in stock, but can be furnished in 2 or 3 weeks' time.

The President—You say they do not carry these combination fixtures in stock? It seems to me that the importance of the gas industry and the demand of a combination fixture of equal value to whichever light is consumed, ought to be on the market without a special order being given. Isn't there a demand for them?

Mr. MacNab—There is a a certain demand for them, but they are high-class fixtures. You take high-class electric fixtures and in placing your order you have to wait until those fixtures are sent for. There is no manufacturer who carries those fixtures in stock. They do carry cheap, everyday fixtures.

The President—In these cheap, everyday fixtures is it not a fact that they are so constructed that the electric service obtained from them is superior to the gas service; that is, the part of the fixture for the use of electricity is placed in a better position than that for gas?

Mr. MacNab—No. I understand you have reference to the drops?

The President—I have reference to the regular cheap combination fixture upon the market.

Mr. MacNab—Of course, the cheap combination fixtures do.

The President—I mean that the combination fixture is planned in such a way that there is a temptation to use electricity instead of gas.

Mr. MacNab—Yes, in the cheap combination fixtures.

The President—Why couldn't a fixture be put on the market that would make the light obtained from the gas equal to the light obtained from the electricity?

Mr. MacNab—That might be done. One drawback to that is that they use the cheap gooseneck burners, with which they have to use an upright arm in order to put them on.

Mr. Cooke—The gas arc proposition is an interesting one. There are two features that were brought out this morning that are interesting to me. First, the element of heat which we must consider. The next question is that brought out by our President in which he suggests, and Mr. Barnes also, that the company should sell the lamp, and have the maintenance contract. I should like to hear from the other members of the Association as to what they think about that, in the face of the fact that the electric companies put their arc lights out and do not attempt to sell them. How can we go to a customer and induce him to buy an arc lamp when the electric company comes along and says, "We will hang the lamp up there without any charge other than what you pay for your current?"

Mr. Dykeman—Mr. Cooke's point is very well taken, I think. We being a combination company, we have just that opposition to meet with. The electric end of it will go in and take the contract for lighting a store. They will supply the arc lamps and with that comes the trimming of the mantles free of charge. All they pay for is the minimum charge and the current. It is only lately that we have commenced to sell the arc lights and I have been opposed to it and have thought we ought to put our arc lights on rental. It carries with it on the contract the mantles. It is the mantleman's business to go out and see that those arcs are in proper shape and give the highest degree of efficiency. There can be no possible comparison between that and the sold arc. A great many customers will say, "I will buy your arc," but will refuse to take the maintenance. The result is that that lamp deteriorates, gets dirty. The mantles become broken and the burners get choked up, and when they try to use the lamp it is in such a shape that we ourselves are ashamed of it. It has been our custom, even where we do not have a maintenance contract, to make a periodical call and see that the lamp is in shape. Of course, that on a strict financial basis would be a loss. So, my contention is that every lamp put out should be put out on the rental basis, for in that way the company is assured of the strict maintenance of that arc and that it is always in shape to be in service, and in better shape to meet the competition of the electric end of the business, which does the trimming free of charge.

Mr. Cooke—I would like also to get an expression from the members in reference to the maintenance of arc lamps during the summer period when they are not in use. Do you follow up your inspection as regularly as you do during that period when the lamps are in use, the thought being that with the combination business it is their duty to see that the lamp is in condition to operate at any and all times?

The President—Will some one please answer Mr. Cooke's question, relating their experience.

Mr. Dykeman—It is our practice to maintain our lamps at all times and in all seasons just as faithfully as we do when they are at their highest and greatest consumption. My maintenance men simply get raked over the coals where there is a lamp that shows it has been neglected. I believe the lamps should be maintained at all times. The lamp is there and the customer is paying the rental on it. We have agreed to maintain it, and, therefore, it is our duty to maintain it at all times.

Mr. Eves—There is one important matter in connection with the gas arc question that ought not to be overlooked and which ought to be emphasized. We know that we have, in favor of the gas arc, the superiority of the illumination and the comparative lowness of cost, but it must not be forgotten that where the gas arc is used the vitiation of the atmosphere in the store or public building is much smaller than where electric arcs are used. That is accounted for by the fact that the gas arc is a better remover of the vitiated air through the ventilators. It is the better and more sanitary arc, for the reason that the air being drawn from the floor, where the people breathe the air, is removed by the ventilators at the top of the building. Those of you who were at the exhibit in New York in December last will remember that we had there the highest candle power and light that has ever been shown in any building by means of gas. There was there shown 355,000-candle power illumination, and with that light it was stated in the New York papers and proved afterwards the atmosphere of the hall in Madison Square Garden was never so pure as on that occasion. That goes to prove the value of the gas arc as a ventilator of stores and rooms. I think that is one of the most important facts we can make known, and it has never been questioned by the electric companies. [Applause.]

Mr. Graf—I have always been heartily in favor of selling gas arcs where it is possible. The point Mr. Cooke made is well taken and it seems to me that in our business we come across a great many cases where, taking the matter of installations or remodeling at any time, if they do not buy gas arcs, the chances are they will buy some other kind of fixtures. If we rent the gas arc we are sure to get the maintenance. And I have always been very firm in my opinion and I have ordered that if we cannot get the maintenance of a gas arc, do not sell it, because it won't do the company any good. If you get the maintenance and add a small amount in addition to the maintenance for rental; probably in 2 years you will have that gas arc paid for, and it seems to me we ought to take the chance for that short period. On top of that we have the argument that the total cost of gas, including maintenace and rental will show a saving over any form of electric lighting, and that is what the consumer is interested in. He is interested in final cost for everything, so I say, "if you can sell the arc provided you have the maintenance. If you cannot sell it, rent it."

The President—Is there anything further, gentlemen?

Mr. Griffin—I would like to ask what would be considered a proper amount to charge for maintenance?

The President—Are there any other comments or questions, gentlemen, on Mr. Barnes's paper? If not, Mr. Barnes will close the discussion.

Mr. Barnes—Mr. President and gentlemen, in regard to the question of small piping, we would have to take that up locally. I don't

know how you would attend to that. It depends entirely upon the amount of business you would receive from the installation and where it was and different things. That would be a matter purely of local conditions. And unless the pipe was very small indeed any drop will supply an arc for 20 feet of gas, any 3-inch drop will supply an arc, providing the pipe is clean. So I think you would have to take care of that to suit your convenience. That is as near as I can get to that. Now the maintenance cost: To determine the cost you would have to get a system. Every company has a different system, and every line of companies has a different system. Of course, our company is a small company and we do not need very much of a system. The company I used to be with had a large number of arcs on maintenance. We had 5,000 arcs on maintenance, and they had a very elaborate system and figured it very closely, figured in the clerical labor and shop labor and cost of mantles, etc. I could not explain the system to you, but I think possibly we ought all to be able to determine upon some kind of a system of cost. Now, in even my little plant, I have 300 or 400 arcs out. We have a small system and we know about what a lamp costs us. We do not figure in clerical labor and different small items, as the company I was speaking of did. Now, in combination plants, or plants where one company controls electric light and gas, I think they should have a different plan in putting out their arcs from a competitive company.

Mr. Dykeman—We have a combination company, and we consider the electric end of it our competitor. We do not consider them as part of us. They are our competitor, and a very active competitor, and a very aggressive competitor.

Mr. Barnes—But at the end of the year—your plant is capitalized under one capitalization and the money earned by the combination plants goes to pay the dividends. You being the gas superintendent will fight for gas, but the stockholder doesn't care whether people burn electric light or gas.

Mr. Dykeman—I am afraid they do care. We consider the electric end of the business as simply a competitor and a very active competitor.

Mr. Barnes—There was a paper written not very long ago in Denver. I think Mr. Stannard, of the Denver Gas and Electric Company, had written the paper upon that very same thing. Now the way they figured was this: They figured whether it will be better to install electric light in this building or whether it would be better to install gas. Now they figured that for the cheaper places, like saloons and restaurants, and the cheaper class of buildings, you might say, it would be better to install gas, but in the better class of buildings, like large dry goods stores, all first-class stores, they figured it is better to install electric light. Now they have a combination plant and that is their theory. I think it is very well taken. I never worked for a combination plant. But it seems to me you will have to admit this: That electric light is a very strong competitor in the gas business, and you go up and down the streets of Indianapolis, where they have the cheapest gas, or about the cheapest manufactured gas in the United States, and you can see hundreds and thousands of installations of electric light. Now that shows that you have got to look the matter right square in the face. You can say gas is best and cheapest, but it seems to me that we have got that thing to contend with, that so many people are using electric light. Of course, we all have to make a living, but it seems to me that when you go down the street and see the hundreds of places that are lighted up with electric light that, if they have to pay twice the money for half the light, there is a soft lot of business men in the city of Indianapolis and every other city. Now I am not taking the part of the electric light company, but I realize that it is very different where you have a combination plant to put out arc lights than it is where you have a competitive concern. That is, to my way of thinking. Of course you have to figure cost and if you can make more money in putting out gas arcs, naturally the general manager will ask you to put out as many as you can. If he made more money on electric installations he would be a business man and tell you to put out as many electric installations as you could. That is only a matter of business with a combination plant. It is a matter of business with us in a straight gas plant to get as much business as we can and talk our points. Do it honestly, of course. You can talk a great deal stronger with a straight plant than with a combination plant. Now, about trimming the arcs. One gentleman said that ofttimes the argument was that they could trim their own arc better—that is, the party that bought the arc could trim it better than the gas company. Well it depends entirely upon what you are going to charge for maintenance, but at the ordinary charge, as I understand it, you couldn't buy a good mantle for the price that the gas company charges for maintaining a gas arc, and most of the companies maintain them at least once a week, or put on the necessary material. Of course we buy the mantles a great deal cheaper than an individual can buy them. He would probably pay twice the cost, and I don't think there is much room for argument on this question, Now the rental proposition is quite a proposition for gas companies. According to the manufacturers two-thirds of all the arcs used in the cities are rented. I have a friend working for a Chicago company. They rent their arcs entirely, and the last time I saw him he told me they had 80,000 arc lights in Chicago. They charge a dollar a month rental and they get the dollar in advance, which is a very good plan. I wish I could rent arcs that way. The two plans that Mr. Graf talked about, both the rental and sales plans, I think are the very best plans. Now you put that up to a man, you show him the two ways, say, "If you want to buy the arc we will sell it to you; if you want to rent it we will rent it; but we will rent it to you at this price and at the end of so many years you will have paid for this arc, and we will take care of it all this time. We will take care of the other arcs and charge you so much maintenance." So that by putting up both plans to the consumer he can take his choice. If he don't feel like putting the investment in the arc he can rent it, and in the meantime he will be buying it. Now, the depreciation on arcs, of course, is something; the interest on the investment is something, and the different things mount up. The proper charge for maintenance is rather hard to determine. You can't maintain arcs for less than 25 cents per month, that is, maintain them weekly. You have to have a pretty good organization and operate carefully, and have quite a numder of arcs to maintain them for 25 cents a month. Where I formerly worked we had 5,000 arcs and our maintenance cost us about 23 cents per arc, and they figured pretty close; they bought close; they bought a good many thousand mantles at one time, and small plants couldn't do that. We have to pay a little larger price than they did, so I think 25 cents is cheap enough. [Applause.]

The President—Mr. Barnes, we are very thankful to you for your contribution.

(To be Continued.)

Special English Correspondence.

COMMUNICATED BY NORTON H. HUMPHRYS.

SALISBURY, ENGLAND, Feb. 10th, 1910.

Standard Test Burners.—An Impracticable Notion.—Some Businesslike Ways of Advertising.

Not the least unsatisfactory feature about official photometrical tests is the fact that they are in no sense absolute. They simply represent the result obtained—with one particular burner used under one particular set of conditions. There is a general disposition on the part of gas examiners, who, like expert witnesses, are expected to make the best possible case on behalf of their employers, to ignore this fact, and to represent the standard burner as an absolute measure of value, of the same category as an avoidupois pound weight, or an imperial pint measure, and to assume that the result of their tests is an absolute indication of the value received by the consumer. In effect, they say that just as the number of yards of cloth, or pounds of sugar, received by a purchaser in exchange for a certain sum of money, represents *pro rata* the value received, so the candle power as reported from the official testing room, represents *pro rata* value to the gas consumer. If the purchaser receives 15 yards instead of 16 yards he would be the loser to the extent of $\frac{1}{16}$, and in a similar manner they infer that if a 15-candle gas is supplied in place of a 16, a corresponding loss takes place, or conversely that if the gas company can be forced to supply 16 in place of 15-candle gas, they reduce the consumer's gas bill to a corresponding extent.

The chief fallacy underlying this mistaken way of looking at the matter is the neglect of the question of price and the conditions which regulate it. A necessary factor in their argument is the assumption that the price is fixed and unalterable, and that if the cost of manufacture is lowered by a reduction from 16 to 15 candles, the company get the full benefit and the consumer nothing. Now the truth is, that under the standard dividend the consumer gets the whole benefit of any economy in working costs and under the sliding scale he gets six-sevenths. Bearing this in mind, it is evident that the higher photometrical quality may be (and in most cases, is) the more expensive to the consumer. Suppose a 16-candle gas can be sold at 2s. 8d. per 1,000 cubic feet, and a 14 at 2s. 3d. Unless some special reasons can be quoted in favor of the 16-candle quality; the 14 is the cheapest in the end. The want of a proper appreciation of the position has cost gas consumers millions of pounds. The local authority have thought that they were scoring a point by forcing the standard from 15 to 16 candles, or from 16 to 18, whereas, as a matter of fact, they have put a larger proportionate loading of a permanent character, on the selling price.

These considerations are suggested by a report issued by the Gas Examiner of the Corporation of Cardiff, on the effect to the consumers, of the Cardiff Gas Company having obtained statutory powers to substitute the No. 2 Metropolitan Argand for the No. 1 London Argand, which has hitherto been accepted as the standard burner. An average of 16 tests, taken on the same sample of gas, gave a result of 14.95 for the No. 2 Metropolitan and 11.93 for the London Argand, showing 3.02 candles in favor of the former. Tests were also taken with the No. 2 Metropolitan and a flat flame burner, and showed still greater divergence, viz., 4.52 candles. These results are higher than those usually accepted in the profession, and it is a matter of common knowledge that the matter stands thus: Metropolitan No. 1, 2 candles more than the London No. 1; No. 2 Metropolitan, 2½ candles more. The results are subsequently dealt with in the report in a manner conveying the impression that they represent the *pro rata* value to the consumer as above instanced. The No. 2 London Argand was used as the standard in Acts obtained more than 30 years ago. About that time the Metropolitan No. 1 was introduced and to a great extent displaced the other. To meet the 2-candle additional value the standard was raised. With the No. 1 London the standard was usually 14, and with the Metropolitan No. 1 this was brought up to 16, presumably for the consumers' benefit, as a means of maintaining the *status quo*, but actually to his great disadvantage.

The report carries more than local interest at the present time, when an endeavor is being made to get into line by establishing the No. 2 Metropolitan as the recognized standard. I have already stated the reasons for its selection as such. Various local authorities are opposing the motion, some from a *bona fide* notion that it is an attempt to score at the expense of the consumers and others because they look

upon the fact of a company going to Parliament for any purpose as an opportunity for securing concessions by means of threats of opposition. One point becomes more and more evident, and that is that the whole order of gas manufacture and distribution, from the retort to the burner, has so changed within the last half century that the Parliamentary regulations, based on the conditions of 50 years ago, are now to a great extent obsolete and useless: and that all such enactments, whether referring to official tests or to any other matters in connection with the supply of gas, should be based on the actual existing conditions of 1910 and not on the traditions of 1860. The fact that the new standard gives better results from the same gas is in no sense an exclusive plum for the gas company. In the case of the standard dividend it is no direct advantage at all. Under the sliding scale the suppliers may benefit to the extent of ¼. In either case it is largely to the benefit of the consumer, as likely to facilitate reduction in price and in the cost as compared with the actual value received.

An extraordinary suggestion in connection with slot or automatic meters hails from Manchester, from a gentleman who regards this useful appliance as a demoralizing agent for the young, apart from the facilities it affords for the operations of professional thieves. This temptation is to be done away with and the professional operators checkmated by the use of disks or tokens, a notion which in itself is not altogether a novel idea. I have some recollection of pointing out on some previous occasion that the simplest way of meeting objections to the slot system was by the substitution of the prepayment plan as suggested by the late Mr. Valon, or by weekly collections, as practiced for many years in Manchester and elsewhere. A sufficient supply of tokens is to be provided by the suppliers of gas, and to be retailed out to a selected number of shopkeepers, one in each street or district, who in their turn will supply the consumers with such small quantities as may suffice say for a week's needs. The traffic in these tokens is to be limited to the licensed dealers, and unauthorized traffic with them is to be subject to penalty. As an inducement for the suppliers it is suggested that the necessity for frequent clearances would no longer exist, and that a smaller staff of collectors would be able to run the show.

The author of this scheme does not appear to have figured out, on the one side, the actual or the percentage of loss by stealage as compared with the annual turnover, or on the other, the cost of running the token plan, on a similar basis. It is very desirable to remove everything of a demoralizing character from the surroundings of the young, or the old also, for that matter, but it cannot be said that the convenient slot meter offers the easiest and best facilities for development of dishonesty. There is no reason for supposing that the state of public morals in this direction is worse to-day than it was 20 years ago, when the slot meter was scarcely known. We all endeavor by the use of locks and keys, and so forth, to limit the area of operations available for the professional thief. But it is to be feared that the introduction of tokens would not have much effect in reducing the number of charges of theft that come before our law courts. The professional thief does not expect to find the first door he trys left open ready for him. He goes on to 20 or more till he lights upon the one that has been inadvertently neglected. And finding the slot meter door effectually blocked, he would simply look for another one. It would not be an impossible matter, or a difficult one, to dispose of tokens amongst the consumers, and the prevention of illicit traffic would be impossible. With the aid of a few confederates amongst the consumers, it is quite possible that the last state might be worse than the first.

While the advantage offered by the suggestion are at best doubtful, the disadvantages are evident and plain. It would be an additional complication for the consumer, who above all things requires a system that is simple and easy. The slot consumer class do not as a rule wish to pay for a thing before it is wanted, and the necessity for keeping a few shillings continually invested in advance would be a real hardship. And at times when the supply ran out unexpectedly, it would be inconvenient to wait in the dark while some one ran to the nearest token shop. And in a populous district the retailer of tokens would be rung up at all hours of the night. These agents would expect a substantial commission on the turnover for their trouble. The suppliers of gas would have to provide a liberal supply of tokens, especially if they reduced their staff and cleared the tills less frequently. If the clearances were made once in 3 months they would need a 4 or 5 months' supply. Frequent visits from the collectors are an indispensible feature of a successful slot business. Changes of residence are frequent amongst the slot class, and the agents of the company must be quite in touch with the consumers and have the fittings and other property of the company well in view. The token system could not be worked at a loss of less than 5 per cent. on the annual turnover, and the question is—who is to pay this 5 per cent. The company's profits would not admit of it, and the slot consumer, of all parties, is the least able to bear any extra or unnecessary expense.

I have sometimes been rather sarcastic at the expense of parties who seek to achieve notoriety for their wares by methods that are not confined to the limits of taste or good sense, and it is gratifying to be able to notice some improvement. I am at this moment reminded that it is the day for the despatch of my American letter, by a date case that is fac-simile of a slot meter, and am using an inkstand and pen rest which is an elegant and exact model of a particular make of retort mouthpiece fastening and lid. And on the table there is a match box and tray, the box being a miniature presentation of a gas cooker. These models were sent out by well-known manufacturers at the New Year, and are a pleasant change on the calendar, diary or blotting pad that was formerly provided. The custom of sending a diary, containing all sorts of information except that which happens to be wanted at the minute, was at one time so common that the number received could be reckoned by the dozen, and a very large percentage of them were practically wasted. An artistic and neatly finished model of a well-know piece of gas apparatus at once attracts the attention and appeals to the sense of appropriateness, not only of the user, but of all who enter the office or library. Another idea that has grown of late years is the issue of a well got up catalogue, whose salvation from the waste basket depends upon the inclusion, in the contents, of a quantity of useful technical memoranda, such as is frequently in demand. There are few engineers who have not one or more works of this kind in regular use.

So far as can be at present ascertained, the results of operations during the second half of 1909 are in all cases satisfactory. An increased sale of gas is the general feature, and amongst the reasons that go to account for this must be mentioned the inverted incandescent burner and the steam radiator pattern of heating stove. Excellent business has been done in these lines during the past winter season. Inverted burners are now on the market that are claimed to give a duty of 45 candles per cubic foot of gas used per hour. The inverted mantle, being shorter, is found to be less fragile than the upright mantle. The radiator stove is an efficient and economical source of warmth. It can be nicely regulated and gives off no offensive fumes.

Items of Interest
FROM VARIOUS LOCALITIES.

THE Illinois Gas Association has sent out appropriate cards regarding their meeting next month in Chicago, Ills., containing the legend: "I Luv My Work, But O U Illinois Meeting." To which we say Amen.

THE new holder which has been contracted for by the Sheboygan (Wis.) Gas Light Company is to be built by the Kerr Murray Manufacturing Company.

THE securities of the Union Railway, Gas and Electric Company, of Springfield, Ills., were listed on the Columbus (O.) exchange on Feb. 14. The Company is controlled by E. W. Clark & Co., of Philadelphia, and Hodenpyl, Walbridge & Co., of New York, and was organized in June, 1909. It is composed of the Springfield Railway and Light Company, the Rockford and Interurban Railway Company, the Peoria Light Company and the Evansville Light Company, three Illinois and one Indiana corporation. It has 6 per cent. preferred stock outstanding of $4,250,000 and common stock of $6,000,000, with bonds amounting to $14,975,000. The preferred stock is subject to call at 105 and interest, and the authorized issue is $12,000,000, $7,850.000 being held in the treasury. The combined earnings of the subsidiary companies for the year ended June 30, 1909, were: Gross, $2,698,797; net, $1,328,305; surplus, $695,441. For the common stock 59 is asked and for the preferred 95 is asked. Both stocks have sold at these figures since their issue.

THE annnal banquet of the employees of the Portland (Ore.) Gas Light Company, was held at the Riverton Casino on the evening of the 10th inst. Fred. N. Dow, as President of the Company, acted as toastmaster, and the speakers were Herbert McKenney, Burt L. Johnson and Burton Smart. Mr. Dow also called upon Vice-President William H. Moulton, Superintendent Eugene York, Clarence Lane and Chas. W. Legrow for brief remarks, and all responded in a pleasing manner. There were about 75 in the party and the affair was one of the most successful of the season. A highly appreciated musical programme was furnished for the occasion by Mr. Harry Stuart Files, baritone, Mrs. Madeline Files Bird, contralto, Miss Harriett Farnham Weaver, violinist, and Miss Mary L. Hanscom, accompanyist, and Miss Florence Holland assisted with readings, which added greatly to the joviality of the entertainment.

THE municipal lighting and the finance committee of the Board of Aldermen of Holyoke, Mass., held a conference with Manager Snow and Superintendent Darby of the lighting department on the 7th inst., and the question of the $125,000 loan for the lighting department, to be used in additions and extensions, was discussed. After talking the matter over the committee was unanimons in favor of the loan, and it will be brought before the full Board at their next meeting. This loan is not paid for by taxation, but is paid for out of the receipts of the lighting department and will cause no increase in taxes. Three years ago the lighting department was authorized a loan of $160,000 for additions to its plant, but the increase in use of electricity especially has made it imperative that larger apparatus be used. One interesting point was brought out by Manager Snow when he stated

that by the installation of improved machinery and with the alterations of certain apparatus in the gas department that he was positive within two years he could sell gas for 80 cents per 1,000 cubic feet instead of the $1 rate which is charged at present, could carry the necessary loan easily and could make more money for the department at the present rate with the present apparatus. It was suggested at the meeting that the municipal lighting committee take up the gas proposition and look into it thoroughly, reporting to the Board later in the year, when, if matters look favorable, it is probable that a special appropriation for the gas department will be recommended. The Mayor made a suggestion that perhaps it would be wise to call for a public meeting, when the taxpayers would be present and the gas proposition brought before them.

MR. C. A. LEARNED of the Meriden (Conn.) Gas Light Company has announced that the town of Cheshire, some 6 miles away, will be supplied with gas during the coming summer.

THE Colorado Springs (Col.) Light and Power Company will begin at once spending approximately $20,000 in extending its gas mains in this city and Ivywild and in Colorado City. This decision was made at the annual meeting of the stockholders of the Company on the 8th inst., when officers and Directors of the Company were re-elected. The following are the Directors: R. S. Storrs, R. W. Chisholm, George Bullock, I. W. Bonbright and R. L. Holland. The officers are: George Bullock, New York city, President; R. W. Chisholm, Colorado Springs; Vice-President; R. L. Holland, Colorado Springs, Secretary and Treasurer; H. Morgan and J. W. Ruter, Colorado Springs, Assistant Secretaries and Treasurers. The following compose the Executive Committee: R. L. Holland, R. W. Chisholm and George Bullock.

THE following Gas Companies were chartered in Pennsylvania on the 11th inst.: The Birdsboro Gas Company, of Birdsboro, and the Watsontown Gas Company, of Watsontown, each with a capital of $5,000, Mr. W. S. Bomberger, of Harrisburg, being the principal stockholder. The Millersburg Gas Company, of Millersburg, capital $5,000, with the following incorporators: E. H. Leffler, Millersburg; George F. Leffler, Lewistown; C. E. Schaup, Harrisburg; H. L. Lark, Millersburg, and David Gring, Newport, Pa.

THE South Delaware Gas Company has been incorporated at Philadelphia with a capital of $100,000.

THERE has been listed on the Philadelphia (Pa.) Stock Exchange $1,000 additional American Gas Company stock, completing $250,000 issued, to acquire the Petersburg (Va.) Gas Company, making total listed $1,800,000.

THE aunual returns of the New York and Richmond Gas Company, which supplies Staten Island, N. Y., shows total earnings of $281,883 and net earnings of $122,451. The surplus was $107,380 and net profits for the year were $48,561. Manager Horton is certainly keeping things moving.

AT the annual meeting of the Wilkes-Barre (Pa.) Gas and Electric Company, which was held on the 8th inst., Mr. W. H. Conyngham was re-elected President, and Messrs. W. H. Conyngham, R. L. Forrest, H. S. Graham, J. N. Thompson, F. H. Shelton, C. B. Dougherty, and J. H. Pardee were re-elected Directors, and L. N. Parsons and J. H Perkins were made Directors. Mr. J. N. Thompson was appointed Treasurer, Mr. J. H. Perkins, Secretary and Manager, Mr. W. M. R. Hammon, Assistant Secretary and Assistant Treasurer. The annual report showed total earnings of $430,546; net earnings, $103,962 and accumulated surplus of $120,380.

THE Wilmington (Del,) Gas Company has declared an initial half-yearly dividend of 3 per cent. on the preferred stock, payable March 1, to stockholders of record Feb. 21.

THE gas situation in Minneapolis, Minn, has received the attention of practically every born orator in town. The latest effort along these lines consisted of a joint debate between the Forum and the Law Literary Society, upon the subject: "*Resolved*, That Minneapolis should own and operate a gas plant."

THE stockholders of the Easton Gas and Electric Company met on the 9th inst., in the office of Smith & Brady, in the First National Bank Building, Phillipsburg, Pa., and elected the following Directors: Uzal H. McCarter, S. L. Shober, Jr., H. E. Mitchell, J. M. Porter, Fred R. Drake, Addis M. Whitney, T. W. Cramp, B. F. Cresson, S. C. Smith, E. J. Fox, Chester Snyder, A. D. Chidsey, W. J. Daub and F. S. Bixler. The officers re-elected were: Chester Snyder, President; B. F. Cresson, Secretary-Treasurer and General Manager; Fred. R. Drake, First Vice-President, and S. L. Shober, Second Vice-President.

THE Sayville (N. Y) Gas Company has been incorporated to carry on operations in Bayport, Sayville, West Sayville, Oakdale and Great River. The capital stock is placed at $5,000, consisting of shares of $100 each, and the Directors are George T. Peck and John A. Graham, of Newark, N. J., and E. G. Jones, of Glen Cove.

THE combined net earnings available for dividends of the subsidiary companies of the Massachusetts Gas Companies for January were $243,930, an increase of $42,759, as compared with the corresponding month last year. The December earnings increased $9,323. The earnings of the several Companies follow:

	1 10.	1909.	1908.
B. Con Gas.	$176,456	*$152,227	*$139,842
N. E. G. & C	38,033	35,654	40,124
N. E. C. & C	15,200	5,405	†1,951
E. Boston Gas	6,292	8,693	5,843
Newton Gas	6,620	..	
Cit. Co. of Q	1,327	†808	†916
Total	$243,930	$201,171	$189,204

*Including electric business averaging $1 '.000 monthly, sold Sept. 1, 1909, to the Edison Company. †Deficit.

Surely 1910 will be a banner year.

THE National Gas and Gasoline Engine Trades Association will hold its next annual meeting at the Sinton Hotel, Cincinnati, O., from June 13 to 18.

THE citizens of East Pueblo, Col., have been unsuccessful in their efforts to obtain gas from the city of Pueblo. The situation was summed up in the decision given on Feb. 5, by Judge Rizer, in which he sustained the motion to dismiss made by the respondent in the case of the city against the Pueblo Gas and Fuel Company, a mandamus proceeding instituted for the purpose of compelling the gas Company to extend its mains to East Pueblo, Irving place and the Grove. The suit was dismissed without prejudice. Judge Rizer held that the Company could not be compelled to extend its mains over a long distance to lamp posts erected by the city.

THE Pacific Coal and Gas Company, of Tacoma, Wash., has been incorporated with a capital of $500,000. The incorporators are Messrs. W. McArthur, John Burnett and George F. Clement.

THE Alamogordo Gas Company, of Alamogordo county, N. M., has been incorporated with a capital of $100,000 by R. G. Ferguson, Walter Harpster and others.

THE Fairfield (Ia.) Gas and Electric Company was incorporated on the 12th inst. with a capital stock of $50,000, by C. D. Jones, Silas B. Hovey and E. R. Hovey.

THE United Gas Light and Manufacturing Company, of Wilmington, Del., has been incorporated with a capital of $1,000,000.

Some Notes from Southern California.—The Imperial Valley Gas Company, which supplies the country known as the Nile of America, began operations on the 31st ult. James Stacey had the contract for a strictly modern installation, which consists of a 6-foot 6-inch oil gas generating set of the type adopted by the Domestic Gas Company, and which has met with great success, together with washers, scrubbers, purifiers, a rotary station meter, and a 30,000-foot holder with 8-inch connections throughout. The works supplies the town of El Centro, at which place it is located; and Imperial, 3 miles away, the latter being supplied through a high pressure system with a Reynolds regulating station in control. Calexico, Brawley and Holtville will soon be supplied through the same plant. This then will give the country, which is becoming a great cotton section, all the modern conveniences, as it now has everything else that goes to make up modern living. The price of gas will be $2 on account of the long haul for oil, as the freight costs more than the oil. The Domestic Gas Company, of Los Angeles, has set aside $100,000 to make an extension of 32 miles for the purpose of supplying a very rapidly growing outlying district known as Glendale and Tropico. The service will be strictly high pressure. A number of local companies were organized to supply this territory, but fell down completely, and since the Domestic Gas Company announced that it was going in, the residents have been almost universal in signing, and the company will start with over 1,000 consumers. It is expected that the work will be completed and gas turned on in 90 days after the arrival of the pipe, which should be here shortly. California has been cursed with small gas companies built by promoters. Some 18 months ago a small company was organized in a borough of Los Angeles, known as Huntington Park. There were at the time about 300 available consumers, all of whom the company did not secure. About 2 months ago the Los Angeles Gas and Electric Company decided to extend into this territory and supply the consumers whom the former company had not secured; in fact, the Los Angeles company offered to buy the smaller company out. The result is that the Los Angeles Gas and Electric Company has extended its mains, and the small gas works is for sale. These things are happening all the time in California, and will continue to as time goes on. The Domestic Gas Company, of Los Angeles, has grown to be quite a lusty infant under the tutelage of our friend J. M. Berkely, for there are now some 8,500 consumers connected on the Company's 135 miles of mains, and plenty of good business in sight.—J. M.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

THOS. J. CUNNINGHAM,
ELBERT P. CALLENDER,
EDITORS.

CHARLES H. WADELTON,
MANAGER.

PUBLISHED ON EACH MONDAY OF THE YEAR AT

No. 42 Pine Street, New York.
Telephone, 2996 John.

TERMS:

SUBSCRIPTION—Three Dollars per annum, in advance, Single copies, 10 cents.

The JOURNAL is the official organ of the NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.

MONDAY, FEBRUARY 28, 1910.

The Market for Gas Securities.

The activity in gas shares of a week ago has subsided, and the prices remain at the same low level despite reports of extra dividends, etc.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

FEBRUARY 28.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked*
Consolidated Gas Co.	$78,177,000	100	146¼	147
Central Union Gas Co. — 1st 5's, due 1972, J. & J.	3,000,000	1,000	98	101
Equitable Gas Light Co.— Con. 5's, due 1932, M. & S.	1,000,000	1,000	—	105
Mutual Gas Co.	2,500,000	100	155	165
New Amsterdam Gas Co.— 1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	100	101½
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	37	43
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	100	101
New York and East River— 1st 5's, due 1944, J. & J.	3,500,000	1,000	104	107
Con. 5's, due 1945, J. & J.	1,500,000	—	97	101
Northern Union— 1st 5's, due 1937, J. & J.	1,250,000	1,000	94	100
Standard	5,000,000	100	—	75
Preferred	5,000,000	100	70	100
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	100	105
The Brooklyn Union	15,000,000	1,000	155	156
1st Con. 5's, due 1948, M. & N.	15,000,000	—	95	99
Yonkers	299,650	500	130	—
Out-of-Town Companies.				
Bay State	50,000,000	50	⅝	11-16
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	65
" 1st Mtg. 5's	500,000	1,000	90	96
Boston United Gas Co.— 1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	73	73½
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed Gold Bonds	7,000,000	1,000	104	106¼
Cincinnati Gas and Electric Co.	29,500,000	100	92	93
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	96	98
Columbus (O.) Gas Lt. & Heating Co.	1,682,750	100	90½	91
Preferred	3,026,500	100	75½	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	—	105
Mortgages, 6's	3,600,000	—	—	118
Chesapeake, 1st 6's	1,000,000	—	—	—
Equitable, 1st 6's	910,000	—	—	—
Consolidated, 1st 5's	1,490,000	—	—	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	17
Con. Mtg. 5's	880,000	1,000	92	95
Bonds	75,000	—	—	100
Denver Gas and Electric	458,000	—	102	105
Detroit City Gas Co	5,000,000	50	—	50
" Prior Lien 5's	4,619,000	1,000	97	100½
Detroit Gas Co., 5's	381,000	1,000	75	80
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	102
Essex and Hudson Gas Co.	6,500,000	—	99	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co., 1st Mtg. 5's	1,225,000	1,000	104¾	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	—	112	113½
" Bonds, 5's	10,500,000	—	108	108¾
Indianapolis	2,000,000	—	60	70
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co	250,000	50	82	—
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede Gas Co., St. Louis	10,000,000	100	106	106½
Preferred	2,500,000	100	—	98
Bonds	10,000,000	1,000	104	—
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas and Electric Co. " 1st Mtg. 6's	350,000	1,000	106	106¾
" 6 per cent. scrip, due 1910	100,000	25	60	80½
Massachusetts Gas Companies, of Boston	25,000,000	100	80	80½
Preferred	25,000,000	100	95½	96
Montreal Gas Co., Canada	2,000,000	100	218	218¾
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	56	58
Bonds, 6's	6,000,000	—	137	138
New Haven Gas Co.	2,000,000	25	200	—
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	110½	110¾
1st Mortgage	20,100,000	1,000	—	—
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104¾	105½
San Francisco Gas Co., Cal.	15,500,000	—	—	—
St. Joseph Gas Co.— 1st Mtg. 5's	751,000	1,000	100	102
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgages, 6's	650,000	1,000	113	116
Extension, 6's	900,000	1,000	112¾	115
General Mortgage, 5's	2,465,000	1,000	90	95
Syracuse Gas Co., N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	100	104
Washington (D. C.) Gas Co.	1,600,000	200	360	380
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	361	—

Advertisers' Index.

New advertising, or changes in standing ads., to assure attention the issue following their reception, must be in hand on Wednesday.

GAS ENGINEERS. Page

Albert Ladd Colby, New York City ... 402
Bartlett-Hayward Co., Baltimore, Md. ... 425
Cruse-Kemper Co., Ambler, Pa. ... 412
Davis & Farnum Mfg. Co., Waltham, Mass. ... 424
Drakes Limited, Halifax, England ... 402
Economical Gas Apparatus Construc. Co., Toronto, Ont. 416
Edwin E. Witherby, New York City. ... 402
Evens & Howard Firebrick Co., St. Louis, Mo. ... 356
Frank D. Moses, Trenton, N. J. ... 410
Fred Bredel Co., Milwaukee, Wis. ... 407
Frederick J. Mayer, New York City ... 405
Fred. K. Wells, New York City ... 416
Henry I. Lea, Chicago, Ills. ... 424
H. M. Byllesby & Co., Chicago, Ills. ... 424
Humphreys & Glasgow, New York City ... 424
Improved Equipment Company, New York City ... 406
Isbell-Porter Co., Newark, N. J. ... 408
Kerr Murray Mfg. Co., Fort Wayne, Ind. ... 417
Laclede-Christy Clay Products Co., St. Louis, Mo. ... 430
Parker-Russell Mining and Mfg. Co., St. Louis, Mo. ... 410
Quintard Iron Works, New York City ... 413
R. D. Wood & Co., Philadelphia, Pa. ... 426
The Gas Machinery Co., Cleveland, O. ... 404
The Stacey Mfg. Co., Cincinnati, O. ... 427
The United Gas Improvement Co., Philadelphia, Pa. ... 419
Western Gas Construction Co., Fort Wayne, Ind. ... 432
William A. Baehr, Chicago, Ills. ... 402

GAS WORKS APPARATUS AND CONSTRUCTION.

Bartlett-Hayward Co., Baltimore, Md. ... 425
Connelly Iron Sponge & Governor New Co., York City. 421
Cruse-Kemper Co., Ambler, Pa. ... 412
Davis & Farnum Mfg. Co., Waltham, Mass. ... 424
Deily & Fowler Mfg. Co., Philadelphia, Pa. ... 415
Economical Gas Apparatus Construc. Co., Toronto, Ont. 416
Evens & Howard Firebrick Co., St. Louis, Mo. ... 356
Fred Bredel Co., Milwaukee, Wis. ... 407
Gas Engineering Co., Trenton, N. J. ... 410
Humphreys & Glasgow, New York City ... 414
Improved Equipment Company, New York City ... 406
Isbell-Porter Co., New York City ... 408
Kerr Murray Mfg. Co., Fort Wayne, Ind. ... 417
Laclede-Christy Clay Products Co., St. Louis, Mo. ... 430
Lloyd Construction Co., Detroit, Mich. ... 414
Quintard Iron Works Co., New York City ... 413
R. D. Wood & Co., Philadelphia, Pa. ... 426
Riter-Conley Mfg. Co., Pittsburgh, Pa. ... 411
The Gas Machinery Co., Cleveland, O. ... 404
The Stacey Mfg. Co., Cincinnati, O. ... 417
The United Gas Improvement Co., Philadelphia, Pa. ... 419
Western Gas Construction Co., Fort Wayne, Ind. ... 432

PROCESSES.

Bartlett-Hayward Co., Baltimore, Md. ... 425
Economical Gas Apparatus Construc. Co., Toronto, Ont. 416
Fred Bredel Co., Milwaukee, Wis. ... 407
Humphreys & Glasgow, New York City ... 424
Improved Equipment Company, New York City ... 406
The Gas Machinery Co., Cleveland, O. ... 404
The United Gas Improvement Co., Philadelphia, Pa. ... 419
Western Gas Construction Co., Fort Wayne, Ind. ... 432

SCRUBBERS AND CONDENSERS.

Bartlett-Hayward Co., Baltimore, Md. ... 425
Cruse-Kemper Co., Amler, Pa. ... 412
Davis & Farnum Mfg. Co., Waltham, Mass. ... 424
Economical Gas Apparatus Construc. Co. Toronto, Ont. 416
Evens & Howard Firebrick Co., St. Louis, Mo. ... 356
Fred Bredel Co., Milwaukee, Wis. ... 407
Isbell-Porter Co., Newark, N. J. ... 408
Kerr Murray Mfg. Co., Fort Wayne, Ind. ... 417
Quintard Iron Works, New York City ... 413
R. D. Wood & Co., Philadelphia, Pa. ... 426
Riter-Conley Mfg. Co., Pittsburgh, Pa. ... 411
The Gas Machinery Co., Cleveland, O. ... 404
The Stacey Mfg. Co., Cincinnati, O. ... 417
The United Gas Improvement Co., Philadelphia, Pa. ... 419
Western Gas Construction Co., Fort Wayne, Ind. ... 432

PRODUCER POWER PLANTS.

Economical Gas Apparatus Construc. Co., Toronto, Ont. 416
R. D. Wood & Co., Philadelphia, Pa. ... 426

TAR AND CARBONIC ACID EXTRACTOR.

Bartlett-Hayward Co., Baltimore, Md. ... 425
Economical Gas Apparatus Construc. Co., Toronto, Ont. 416
Fred Bredel Co., Milwaukee, Wis. ... 407
Isbell-Porter Co., Newark, N. J. ... 408
Kerr Murray Mfg. Co., Fort Wayne, Ind. ... 417
The Gas Machinery Co., Cleveland, O. ... 404
The Stacey Mfg. Co., Cincinnati, O. ... 427
The United Gas Improvement Co., Philadelphia, Pa. ... 419
Western Gas Construction Co., Fort Wayne, Ind. ... 432

AMMONIA CONCENTRATORS.

Bartlett-Hayward Co., Baltimore, Md. ... 425
Fred Bredel Co., Milwaukee, Wis. ... 407
Michigan Ammonia Works, Detroit, Mich. ... 402
The Gas Machinery Co., Cleveland, O. ... 404
Western Gas Construction Co., Fort Wayne, Ind. ... 432

GAS METERS.

American Meter Co., New York and Philadelphia. ... 431
D. McDonald & Co., Albany, N. Y. ... 429
Helme & McIlhenny, Philadelphia, Pa. ... 431
John J. Griffin & Co., Philadelphia, Pa. ... 384
Keystone Meter Co., Royersford, Pa. ... 430
Maryland Meter and Mfg. Co., Baltimore, Md. ... 430
Metric Metal Co., Erie, Pa. ... 431
Nathaniel Tufts Meter Co., Boston, Mass. ... 430
New York Improved Meter Co., New York City ... 430
Pittsburg Meter Co., East Pittsburg, Pa. ... 414
Rotary Meter Co., New York City ... 429
Sprague Meter Co., Bridgeport, Conn. ... 429

PREPAYMENT METERS.

American Meter Co., New York and Philadelphia. ... 431
D. McDonald & Co., Albany, N. Y. ... 429
Helme & McIlhenny, Philadelphia, Pa. ... 431
John J. Griffin & Co., Philadelphia, Pa. ... 384
Keystone Meter Co., Royersford, Pa. ... 430
Nathaniel Tufts Meter Co., Boston, Mass. ... 430
New York Improved Meter Co. New York City ... 430
Pittsburg Meter Co., East Pittsburg, Pa. ... 414
Sprague Meter Co., Bridgeport, Conn. ... 429

PREPAYMENT METER ATTACHMENTS.

New York Improved Meter Co., New York City..... 430

WATER METERS.

Pittsburg Meter Co., East Pittsburg, Pa..... 414

GAS AND WATER PIPES.

Davis & Farnum Mfg. Co., Waltham, Mass..... 424
Donaldson Iron Co., Emaus, Pa..... 416
Economical Gas Apparatus Construc. Co., Toronto, Ont. 416
R. D. Wood & Co., Philadelphia, Pa..... 426

GAS COALS.

Berwind-White Coal Mining Co., New York and Phila. 422
Perkins Co., New York City..... 422
Westmoreland Gas Coal Co., Philadelphia, Pa..... 423

GAS MAIN STOPPERS.

Safety Gas Main Stopper Co., New York City..... 423

MAIN AND SERVICE LAYING.

Sullivan Bros., Flushing, N. Y..... 422

GAS TAPPING MACHINES.

George Light, Dayton, O..... 423
H. Mueller Manufacturing Co., Decatur, Ills..... 407

CANNEL COALS.

Perkins & Co., New York City..... 422

STOKING MACHINERY.

Fred Bredel Co., Milwaukee, Wis..... 407
G. A. Bronder, New York City..... 421
Laclede-Christy Clay Products Co., St. Louis, Mo..... 420
Parker-Russell Mining and Mfg. Co., St. Louis, Mo..... 410

CONVEYORS—ALL KINDS.

Bartlett-Hayward Co., Baltimore Md..... 425
Cruse-Kemper Co., Ambler, Pa..... 414
C. W. Hunt Company, New York City..... 424
Economical Gas Apparatus Construc. Co., Toronto, Ont. 416
Fred Bredel Co., Milwaukee, Wis..... 407
G. A. Bronder, New York City..... 421
Kerr Murray Mfg. Co., Fort Wayne, Ind..... 417
The Gas Machinery Co., Cleveland, O..... 404
The Stacey Mfg. Co., Cincinnati, O..... 427
Western Gas Construction Co., Fort Wayne, Ind..... 432

CHARGING BARROWS AND COAL WAGONS.

Davis & Farnum Mfg. Co., Waltham, Mass..... 424
Kerr Murray Mfg. Co., Fort Wayne, Ind..... 417
The Stacey Mfg. Co., Cincinnati, O..... 427

GAS ENRICHERS.

Standard Oil Co., New York City..... 423

COKE CRUSHERS.

Bartlett-Hayward Co., Baltimore, Md..... 425
C. M. Keller, Columbus, Ind..... 423

GAS METER CONNECTIONS.

H. Mueller Manufacturing Co., Decatur, Ills..... 407

GAS COCKS.

H. Mueller Manufacturing Co., Decatur, Ills..... 407

GAS GAUGES.

The Bristol Co., Waterbury, Conn..... 416

GAS GOVERNORS.

Chaplin-Fulton Mfg. Co., Pittsburg, Pa..... 426
Connelly Iron Sponge & Governor Co., New York City. 421
Evens & Howard Firebrick Co., St. Louis, Mo..... 356
Isbell-Porter Co., Newark, N. J..... 408
Pittsburg Meter Co., East Pittsburg, Pa..... 410
Reynolds Gas Regulator Co., Anderson, Ind..... 421

CEMENTS.

C. L. Gerould, New Castle, Pa..... 420
Ernst Strassburger, Chicago, Ills..... 420
Laclede-Christy Clay Products Co., St. Louis, Mo..... 420

RETORTS AND FIREBRICKS.

Baltimore Retort and Firebrick Co., Baltimore, Md... 420
Didier-March Co., New York City..... 405
Evens & Howard Firebrick Co., St. Louis, Mo..... 356
Fred Bredel Co., Milwaukee, Wis..... 407
Gas Bench Construction Co., St. Louis, Mo..... 413
Henry Maurer & Son, New York City..... 413
Improved Equipment Company, New York City..... 406
James Gardner, Jr., Co., Bolivar, Pa..... 422
J. H. Gautier & Co., Jersey City, N. J..... 420
Laclede-Christy Clay Products Co., St. Louis, Mo..... 420
Missouri Firebrick Co., St. Louis, Mo..... 420
Parker-Russell Mining and Mfg. Co., St. Louis, Mo.... 410

INCLINED RETORTS.

Baltimore Retort and Firebrick Co., Baltimore, Md... 420
Didier-March Co., New York City..... 405
Evens & Howard Firebrick Co., St. Louis, Mo..... 356
Fred Bredel Co., Milwaukee, Wis..... 407
Gas Bench Construction Co., St. Louis, Mo..... 413
Improved Equipment Company, New York City..... 406
Laclede-Christy Clay Products Co., St. Louis, Mo..... 420
Parker-Russell Mining and Mfg. Co., St. Louis, Mo... 410

VERTICAL S'S.

Connelly Iron Sponge & Gov. Co. (Drake's [Eng.] System) 421
Didier-March Co., New York City..... 405
Evens & Howard Firebrick Co., St. Louis, Mo..... 356
Fred Bredel Co., Milwaukee, Wis..... 407
Gas Bench Construction Co., St. Louis, Mo..... 413
Improved Equipment Company, New York City..... 406
Laclede-Christy Clay Products Co., St. Louis, Mo..... 420
Parker-Russell Mining and Mfg. Co., St. Louis, Mo.. 410

REGENERATIVE FURNACES.

Baltimore Retort and Firebrick Co., Baltimore, Md.. 420
Bartlett, Hayward & Co., Baltimore, Md..... 425
Didier-March Co., New York City..... 405
Evens & Howard Firebrick Co., St. Louis, Mo..... 356
Fred Bredel Co., Milwaukee, Wis..... 407
Gas Bench Construction Co., St. Louis, Mo..... 413
Improved Equipment Company, New York City..... 406
J. H. Gautier & Co., Jersey City, N. J..... 420
Laclede-Christy Clay Products Co., St. Louis, Mo..... 420
Missouri Firebrick Co., St. Louis, Mo..... 420
Parker-Russell Mining and Mfg. Co., St. Louis, Mo... 410

SELF-SEALING MOUTHPIECE DOORS.

Bartlett-Hayward Co., Baltimore, Md..... 425
Davis & Farnum Mfg. Co., Waltham, Mass..... 424
Fred Bredel Co., Milwaukee, Wis..... 407
Isbell-Porter Co., Newark, N. J..... 408
Improved Equipment Company, New York City..... 406
Kerr Murray Mfg. Co., Fort Wayne, Ind..... 417
Parker-Russell Mining and Mfg. Co., St. Louis, Mo..... 410
Quintard Iron Works, New York City..... 413
R. D. Wood & Co., Philadelphia, Pa..... 426
The Gas Machinery Co., Cleveland, O..... 404
The Stacey Mfg. Co., Cincinnati, O..... 427
Western Gas Construction Co., Fort Wayne, Ind..... 432

INCANDESCENT GAS LAMPS.

General Gas Light Co., Kalamazoo, Mich..... 409
Welsbach Company, Gloucester, N. J..... 418

BURNERS.

Wm. M. Crane Co., New York City..... 416

STREET LAMPS.

Thos. T. W. Miner, New York City..... 402
Welsbach Street Lighting Co., New York and Phila.. 418

GAS BLAST FURNACES.

American Gas Furnace Co., New York City..... 408

PURIFIERS.

Bartlett-Hayward & Co., Baltimore, Md..... 425
Connelly Iron Sponge & Governor Co., New York City. 421
Cruse-Kemper Co., Ambler, Pa..... 412
Davis & Farnum Mfg. Co., Waltham, Mass..... 424
Evens & Howard Firebrick Co., St. Louis, Mo..... 356
Isbell-Porter Co., Newark, N. J..... 408
Kerr Murray Mfg. Co., Fort Wayne, Ind..... 417
Quintard Iron Works, New York City..... 413
R. D. Wood & Co., Philadelphia, Pa..... 426
The Stacey Mfg. Co., Cincinnati, O..... 427
The United Gas Improvement Co., Philadelphia, Pa... 419
Western Gas Construction Co., Fort Wayne, Ind..... 432

(*Continued on page 402.*)

ANNA VIRGINIA MILLER,

Lecturer and Demonstrator of Cookery by Gas or Electricity,

1237 Harrison Street, Kansas City, Mo.

1805-3m

POSITION AS GENERAL FOREMAN

Wanted by a man 29 years old, with 12 years of practical experience in all branches of the gas business. Strictly up to date on the manufacture of coal and water gas, fitting and distribution departments. First-class mechanic and can handle men and get results. Reconstruction of coal and water gas plants. First-class references.

Address, "BLUE PRINT,"

1811-4 Care this Journal.

MRS. HELEN ARMSTRONG,

Special Courses of Demonstration Lessons

FOR

GAS COMPANIES.

10 Years' Experience.

For Terms and Particulars, Address,

MRS. HELEN ARMSTRONG,

1811-2 ORLANDO, FLA.

Position Wanted.

Up-to-date solicitor and new business man wants position with gas company in a city of 12,000 to 20,000. At present acting in capacity of manager. One who can get results.

Address, "EXCELSIOR,"

1810-tf Care this Journal.

Wanted, Position

As Manager or Superintendent.

Employed, but desires to change on account of change in ownership. References.

1811-3 Address, "B.," care this Journal.

WANTED.

A manufacturing company wants the services of an experienced traveling salesman who is familiar with the construction of gas meters. Address, stating experience, etc.,

"MANUFACTURING CO.,"

1812-1 Care this Journal.

WANTED,

An Experienced Draftsman in Furnace Construction and Retort Bench Work.

Steady employment. Good salary to satisfactory party. Address, "B. Q.,"

1811-4 Care this Journal.

FOR SALE,

SIX HUNDRED 3-LIGHT GAS METERS IN FAIR CONDITION.

Address, UNION LIGHT, HEAT AND POWER COMPANY,

1811-2 NEWPORT, KY.

FOR SALE,

One set of 4 purifying boxes 12 feet 8 inches by 10 feet 9 inches by 3 feet, in good condition, with centerseal and 10-inch connections.

1771-tf YORK GAS CO., York, Pa.

STANDARD REDUCTION FACTORS for GASES,

By Helon Brooks MacFarland, B.S., M.M.E.

Price, $1.50. *For Sale by*

A. M. Callender & Co., 42 Pine St., New York City.

FOR SALE,

Second-hand gas apparatus in good order. Selling because outgrown. Ready for immediate delivery.

One 6-foot Tufts' Station Meter, Hinman Drum, 10-inch connections.
One 5-foot Tufts' Station Meter, Hinman Drum, 8-inch connections.
One Standard Washer Scrubber and Standard, with inlet and outlet valves, 10-inch connections.
One No. 3 P. & A. Tar Extractor, 8-inch connections.
Two 3-blade McKenzie Exhausters, 8-inch connections.

NEW BEDFORD GAS AND EDISON LIGHT COMPANY,

1798-tf NEW BEDFORD, MASS.

(Concluded from page 401.)

VALVES.

Bartlett-Hayward & Co., Baltimore, Md..... 425
Davis & Farnum Mfg. Co., Waltham, Mass..... 424
Economical Gas Apparatus Construc.Co., Toronto, Ont. 416
Isbell-Porter Co., Newark, N. J..... 408
Kerr Murray Mfg. Co., Fort Wayne, Ind..... 417
Ludlow Valve Manufacturing Co., Troy, N. Y..... 413
R. D. Wood & Co., Philadelphia, Pa..... 426
The Gas Machinery Co., Cleveland, O..... 404
The P. H. & F. M. Roots Co., Connersville, Ind..... 415
The Stacey Mfg. Co., Cincinnati, O..... 427
Western Gas Construction Co., Fort Wayne, Ind..... 432

PURIFYING MATERIALS.

Connelly Iron Sponge & Governor Co., New York City 421
F. Behrend, New York City..... 416
The United Gas Improvement Co., Philadelphia, Pa... 419

EXHAUSTERS.

Connelly Iron Sponge & Governor Co.,New York City 421
Connersville Blower Company, Connersville, Ind..... 428
Davis & Farnum Mfg. Co., Waltham, Mass..... 424
Isbell-Porter Company, Newark, N. J..... 408
Kerr Murray Mfg. Co., Fort Wayne, Ind..... 417
Piqua Blower Co., Piqua, O..... 413
The P. H. & F. M. Roots Co., Connersville, Ind..... 415

HIGH PRESSURE GAS GOODS.

H. Mueller Manufacturing Co., Decatur, Ills..... 407

PURIFIER AND SCRUBBER TRAYS.

Bartlett-Hayward Co., Baltimore, Md..... 425
Cabot Mfg. Co., Hoboken, N. J..... 423
Western Gas Construction Co., Fort Wayne, Ind..... 432

PIPE LINE TOOLS.

H. Mueller Manufacturing Co., Decatur, Ills..... 407

GAS PLANT TOOLS.

H. Mueller Manufacturing Co., Decatur, Ills..... 407

GAS STOVES.

American Meter Co., New York and Philadelphia..... 431
Keystone Meter Co., Royersford, Pa..... 430
Maryland Meter & Manufacturing Co., Baltimore, Md.. 430
Nathaniel Tufts Meter Co., Boston, Mass..... 430

HOT WATER HEATERS.

Humphrey Co., Kalamazoo, Mich..... 414

GASHOLDERS.

Bartlett-Hayward Co., Baltimore, Md..... 425
Chicago Bridge and Iron Works, Chicago, Ills..... 403
Cruse-Kemper Co., Ambler, Pa..... 412
Davis & Farnum Mfg. Co., Waltham, Mass..... 424
Delly & Fowler Mfg. Co., Philadelphia, Pa..... 428
Economical Gas Apparatus Construc. Co., Toronto, Ont. 416
Kerr Murray Mfg. Co., Fort Wayne, Ind..... 417
R. D. Wood & Co., Philadelphia, Pa..... 426
Riter-Conley Mfg. Co., Pittsburgh, Pa..... 411
The Stacey Mfg. Co., Cincinnati, O..... 427
Western Gas Construction Co., Fort Wayne, Ind..... 432

STORAGE TANKS.

Bartlett-Hayward Co., Baltimore, Md..... 425
Davis & Farnum Mfg. Co., Waltham, Mass..... 424
Quintard Iron Works, New York City..... 413
The Stacey Mfg. Co., Cincinnati, O..... 427
Western Gas Construction Co., Fort Wayne, Ind..... 432

COKE OVEN ENGINEERS.

Albert Ladd Colby, New York City..... 402

PATENTS, TRADE-MARKS AND COPYRIGHTS.

Royal E. Burnham, Washington, D. C..... 423

Utilize Your Gas Liquor.

NO EXTRA LABOR OR OPERATING EXPENSES.

IMPROVED AMMONIA CONCENTRATOR.

About 100 in use. Write to

STROH & OSIUS, Patentees, or

MICHIGAN AMMONIA WORKS, - Detroit, Mich.

WILLIAM A. BAEHR,

CONSULTING ENGINEER,

Commercial National Bank Building,

CHICAGO.

Also Representing

The Bartlett-Hayward Company.

EDWIN E. WITHERBY,

SPECIAL REPRESENTATIVE

GAS MACHINERY COMPANY,

CLEVELAND, O.,

Will advise on commercial engineering subjects and operation of gas and electric properties.

40 WALL STREET, - NEW YORK.

ALBERT LADD COLBY,

CONSULTING ENGINEER.

ADVICE ON PATENT APPLICATIONS.

MECHANICAL APPLIANCES FOR COKE OVENS.

OFFICE COPIES OF ALL EXISTING PATENTS.

165 BROADWAY, - NEW YORK,

AND

SOUTH BETHLEHEM, PA.

DRAKES

LIMITED,

HALIFAX, ENGLAND.

GAS ENGINEERS AND CONTRACTORS.

"THE MINER"

GLOBE STREET LAMPS.

OVER FORTY YEARS IN USE THE WORLD OVER.

THE BEST STREET LAMPS for ALL KINDS OF GAS OR BURNERS.

This is only one of a Large Variety of Styles.

SEND FOR CATALOGUE.

THOS. T. W. MINER,

821 and 823 Eagle Avenue, New York.

NO. 100 LAMP.

BINDERS

FOR THE

JOURNAL.

PRICE,

$1.

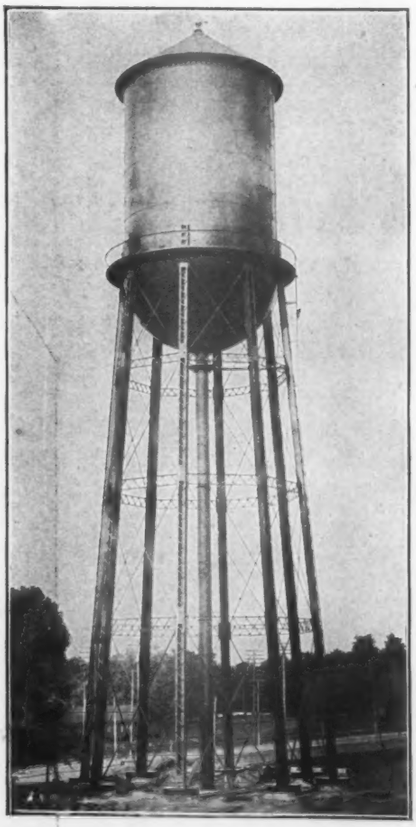
FOR SALE BY

AMERICAN GAS LIGHT JOURNAL 42 Pine St., New York City.

GASHOLDERS,

WATER TOWERS---STANDPIPES---STRUCTURAL STEEL,

DESIGNED, CONSTRUCTED AND ERECTED.



Water Tower, Louisville, Ky.
Capacity, 1,200,000 Gallons. Height, 220 Feet.

For such work our shop equipment and erection force are unsurpassed, which enables us to quote attractive prices.

DESIGNS AND ESTIMATES FURNISHED ON APPLICATION.

CHICAGO BRIDGE AND IRON WORKS,

Main Office and Works: Washington Heights Station, Chicago. Branch Office: 30 Church St., New York.

P. PLANTINGA, President W. E. STEINWEDELL, Secretary

THE GAS MACHINERY CO.,

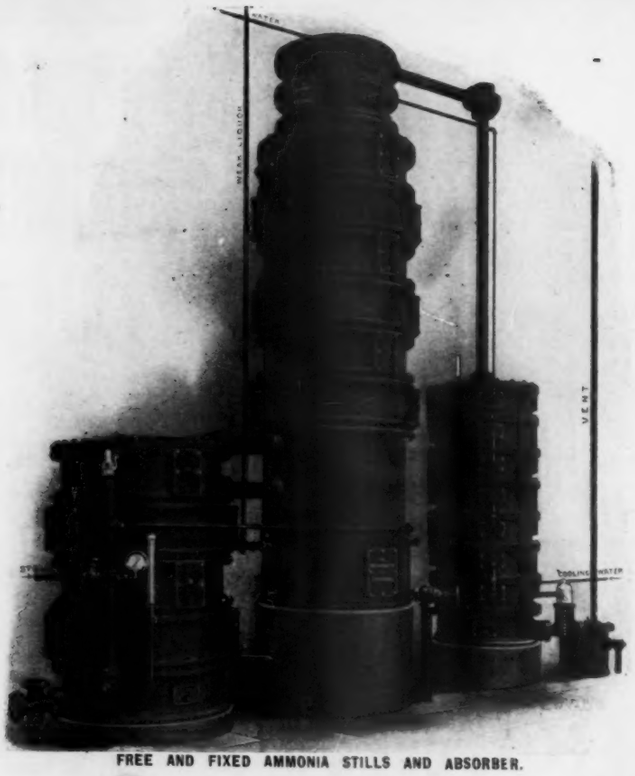
Main Office and Shops

CLEVELAND, OHIO.

COAL AND WATER GAS APPARATUS.

EXHAUSTERS, CONDENSERS, SCRUBBERS,
TAR EXTRACTORS, WASHERS, PURIFIERS,
VALVES, CONNECTIONS.

BY PRODUCT MACHINERY,
COMPLETE GAS PLANTS.



FREE AND FIXED AMMONIA STILLS AND ABSORBER.

THE GAS MACHINERY CO.
CLEVELAND, OHIO.

DIDIER-MARCH COMPANY,

Hudson Terminal Building,

WORKS:
Keasbey, Perth Amboy, N. J.

50 Church Street,
NEW YORK, N. Y.

DESSAU SYSTEM OF VERTICAL RETORTS,

"The Only System in Successful Operation."

U. S. Patent No. 904043.
"Process Patent for the Carbonization of Coal in Vertical Retorts."

U. S. Patent No. 801268.
"Operating Mechanism for Bottom Mouthpieces."

U. S. Patent No. 906187.
"Feeding Device."

U. S. Patent No. 899503.
"Retort House."

U. S. Patent No. 915156.
"Recuperation."

388 Benches, with 3984 Retorts in operation and under construction.

TOTAL DAILY PRODUCING CAPACITY, 60,000,000 CUBIC FEET.

First Installation in the United States of America,

PROVIDENCE, R. I., 12 BENCHES, 120 RETORTS,

Complete, with

Retort House, Coal and Coke Handling Machinery and Storage Bins.

HORIZONTALS AND INCLINES OF APPROVED TYPES.

Correspondence Solicited. **FREDERICK J. MAYER, General Manager.**

WE STOP CLINKERS.

Repeat orders are coming in for new BENCHES and REFILLINGS. The BEST indication the Economizer is MAKING GOOD.

Is it not time for YOU to make a start?

NEW BENCHES—REFILLINGS.

Horizontals—Inclines—Verticals.

THE IMPROVED EQUIPMENT COMPANY,

MAIN OFFICES: 60 WALL STREET, NEW YORK, N. Y.

Western Agents for the Dessau System of Vertical Retorts.

SOLE LICENSEES FOR THE DOHERTY BENCH FUEL ECONOMIZER.

JUST PUBLISHED.

Catechism of Central Station Gas Engineering in the United States.

Compiled from the questions and answers sent out to the Practical Class, Trustees Gas Education Fund.

Section I. General Definitions. Section II. Manufacturing Materials. Section III. Manufacturing Plant---Construction and Operation. Section IV. Distribution System and Consumers' Appliances. Section V. Chemical. Section VI. Physical. Section VII. Masonry Construction. Section VIII. Miscellaneous.

6¼ INCHES BY 9 INCHES. 672 PAGES. ILLUSTRATED.

PRICE:

Cloth, $5 net, plus postage. Flexible Leather, $7 net, plus postage.

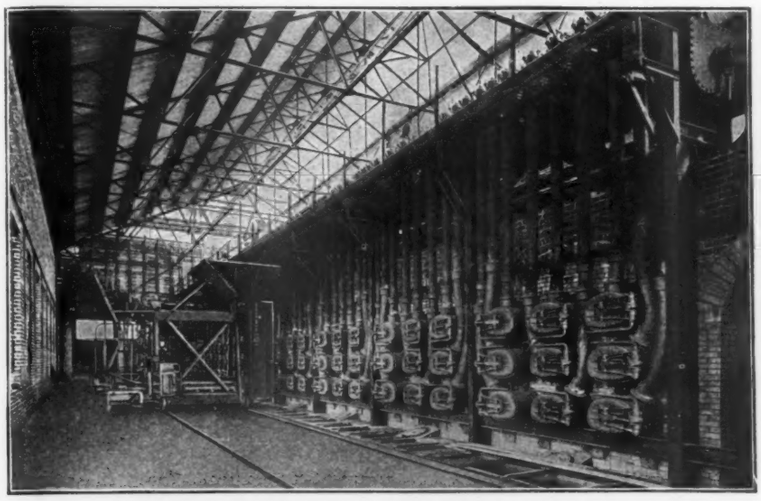
For Sale by TRUSTEES GAS EDUCATIONAL FUND, 58 William Street, New York City.

FRED BREDEL COMPANY,

FRED BREDEL, C.E., President. MILWAUKEE, WIS.

DESIGNERS AND BUILDERS OF COAL GAS WORKS AND APPARATUS.

BREDEL Recuperative Benches with Chamber Recuperator; all sizes, either Horizontal or Inclines.



Retort House with 20 Benches of 9's, Charging and Drawing Machines, Hydraulic Coke Conveyor. Erected for the Richmond City Gas Works. ALL OUR OWN SYSTEM.

Our Benches use less fuel and last longer than any other bench, without exception.

NAPHTHALENE EXTRACTOR-CONDENSERS,
NAPHTHALENE WASHERS,
TAR WASHERS,
AMMONIA WASHERS,
COOLERS,
PURIFIERS, AMMONIA STILLS,
GAS ENRICHING PLANTS,
RETORT HOUSES, STAGE FLOORS,
TURN TABLES.

BREDEL-FOULIS DISCHARGING MACHINE.

SOLE AGENTS FOR

ARROL-FOULIS CHARGING MACHINE, and
FROHNHAUSER COKE CONVEYOR.

Complete Gas Purifying Plants to use in conjunction with high percentage Sulphur Coal. Patented System in Actual Operation.

Mueller
Century Pattern.
(Patented.)

Mueller
Century Patent Combined Clamp and Tee.
(Patented.)

Improved
National Pattern.
(Patented.)

Time is An Essential In Cost.

A poorly made, ill-fitting service clamp requires additional time to adjust--that means an added cost to the clamp.

Mueller malleable or cast iron service clamps fit the pipe for which they are designed and save time in adjusting. A molded lead ring gasket fitting in the underside of the clamp makes an absolutely tight joint.

Unconditionally Guaranteed.

TRADE MARK
MUELLER
REGISTERED

Works and General Offices,
DECATUR, ILL., U. S. A.
West Cerro Gordo St.

H. MUELLER MFG. CO.

Eastern Division,
NEW YORK, N. Y., U. S. A.
254 Canal St. (cor. Lafayette).

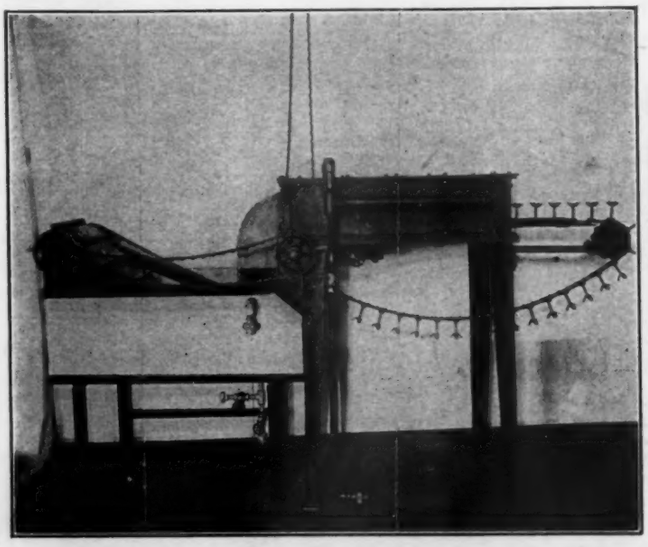
GAS FURNACES and HEATING MACHINES

STATE

AMOUNT -
SIZE - -
KIND - -

OF WORK

to be done in given time.



Heating Machine for Treating Watch Case Blanks and Other Similar Work, with Cooling Bath Attachment.

FOR

INDUSTRIAL PURPOSES.

CATALOGUE SENT ON APPLICATION.

AMERICAN GAS FURNACE COMPANY,
24 John Street, New York, N. Y.

J. S. DeHART, JR., PRESIDENT
A. F. WEHNER, SECRETARY
R. K. WEHNER, TREASURER

ISBELL-PORTER COMPANY

GAS ENGINEERS & BUILDERS OF GAS WORKS

BENCH WORK

CHARGING AND DISCHARGING MACHINERY

MACKENZIE EXHAUSTERS

PRIMARY AND SECONDARY CONDENSERS FOR FRESH OR SALT WATER

ISBELL VALVES SPECIALS

TAR EXTRACTORS

P.&A. TAR EXTRACTORS FOR WATER GAS

ROTARY AMMONIA SCRUBBERS

SHAVING SCRUBBERS PURIFIERS STREET GOVERNORS

MAIN OFFICE AND WORKS
BRIDGE & OGDEN STREETS
NEWARK, N.J.
ESTABLISHED 1865

THE HUMPHREY

GAS ARC LAMP,

Designed, Developed and Distinguished as

"The Gas Company's Lamp,"

Has been one of the most conspicuous successes of the past decade in lighting lines. The competing lamps that were brought out in scores during the earlier days had but a brief life and exist to-day principally as unpleasant memories of ill-considered purchases. **Is not the same thing about to be repeated with Inverted Gas Arc Lamps?**

Adopt the **Humphrey Inverted** as your standard and be insured and protected by the strongest, most liberal and progressive gas lighting organization in the world.

GENERAL GAS LIGHT CO.,

Kalamazoo. **New York.** **San Francisco.**
London, England. **Bremen, Germany.** **Wellington, New Zealand.**

LONG DISTANCE TELEPHONE, 1503-D. FRANK D. MOSES, President.

GAS ENGINEERING CO.,

MANUFACTURERS AND ERECTORS OF

COMPLETE GAS WORKS.

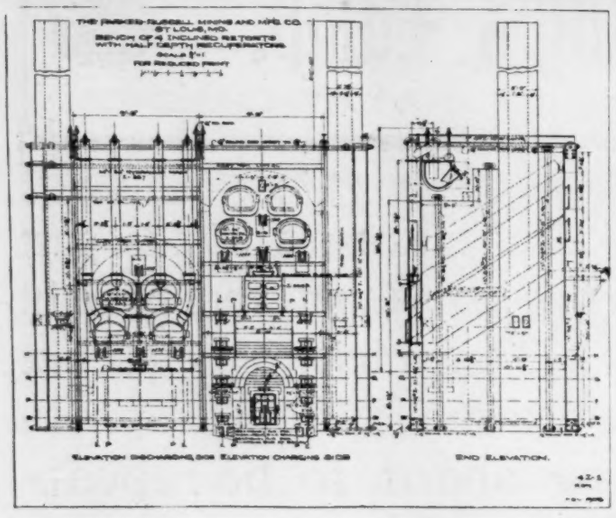
SPECIAL ATTENTION GIVEN TO LARGE PURIFIERS.

OFFICE AND WORKS, - - - - - - - TRENTON, N. J.

THE PARKER-RUSSELL MINING AND MFG. CO.,

Saint Louis, Missouri. New York Office, 45 Broadway.

GAS RETORT BENCHES OF EVERY DESCRIPTION.
WATER GAS LININGS, STOKING MACHINERY, RETORT HOUSES.



This plan shows a bench of inclined fours designed to go in existing retort houses.

Large production of gas, low fuel requirements, reduction in labor.

When you deal with us you get retorts and other fireclay goods we manufacture. We do not buy from others. We know the quality when we ship.

Correspondence Solicited.

All Contracts Made as of St. Louis.

BENCHES.

VERTICAL.--We erect Vertical Benches on the continuous and intermittent systems. We are the Sole Agents of the United States and Canada west of Buffalo, Pittsburg and Toronto, for the Woodall-Duckham Continuous System. We consider this the best system on the market. There is one installation in successful operation at La Grange, Ills. High yield. Very low cost of labor.

PRACTICAL HANDBOOK ON

GAS ENGINES,

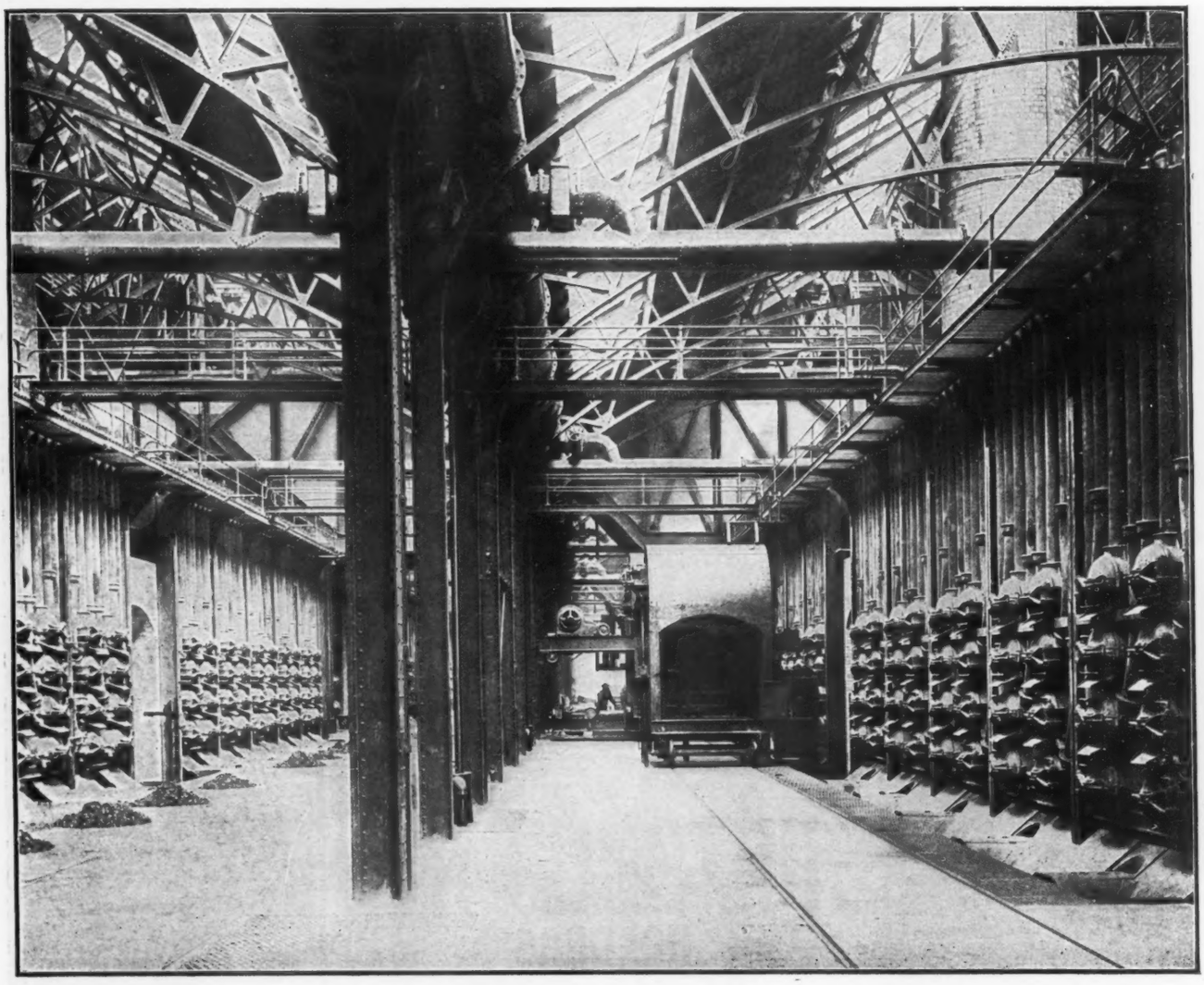
With Instructions for Care and Working of the Same,

By G. LIECKFELD, C.E.

Translated with Permission of the Author, GEO. M. RICHMOND, M.E.

PRICE, $1.00.

For Sale by AMERICAN GAS LIGHT JOURNAL, 42 Pine St. New York City.



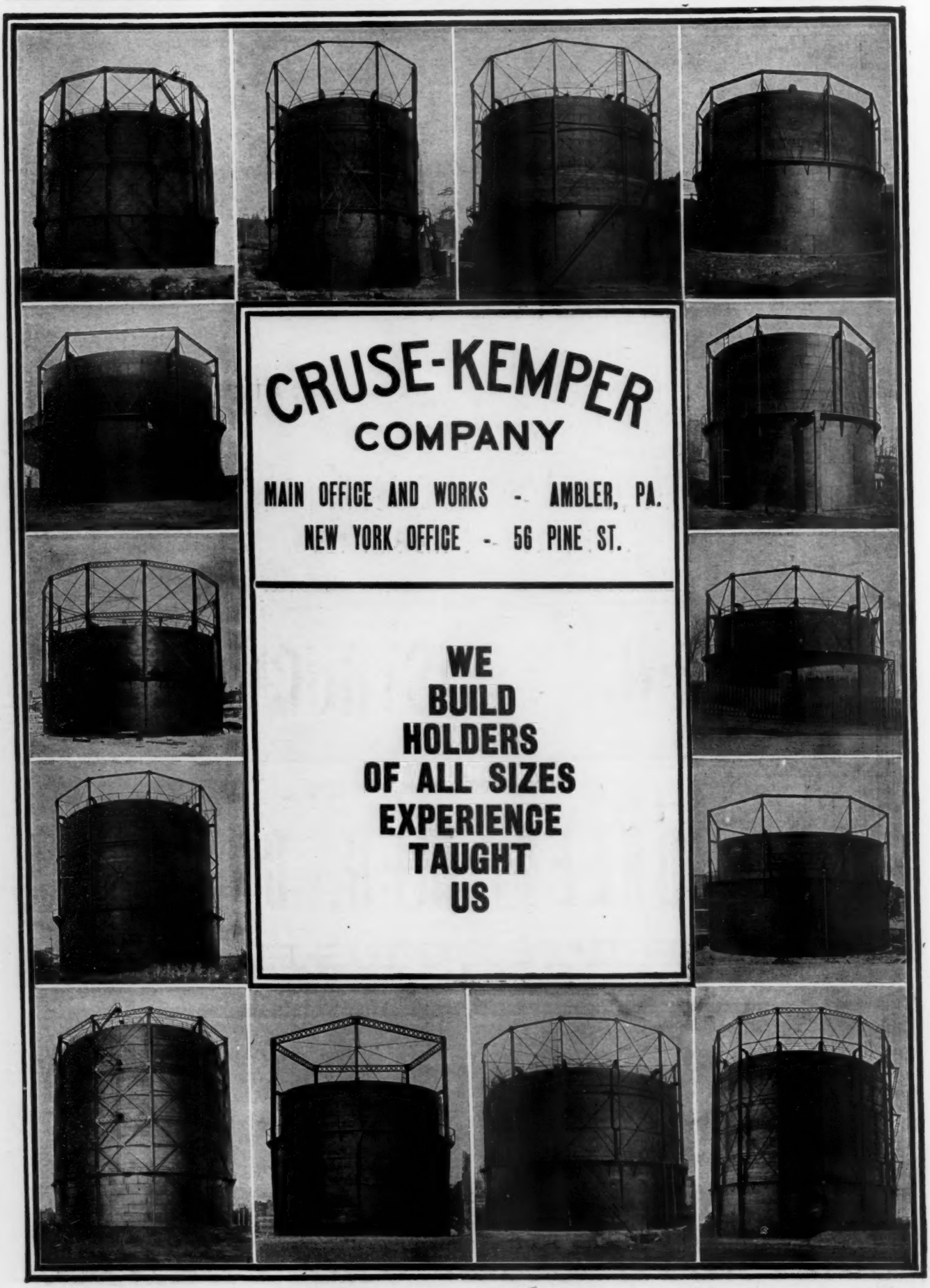
Eleven Millions Capacity in One Retort House.

RITER-CONLEY MFG. COMPANY,

PITTSBURGH.

PLATE AND STRUCTURAL WORK OF EVERY DESCRIPTION.

COMPLETE COAL GAS PLANTS.


CRUSE-KEMPER
COMPANY
MAIN OFFICE AND WORKS - AMBLER, PA.
NEW YORK OFFICE - 56 PINE ST.
WE
BUILD
HOLDERS
OF ALL SIZES
EXPERIENCE
TAUGHT
US

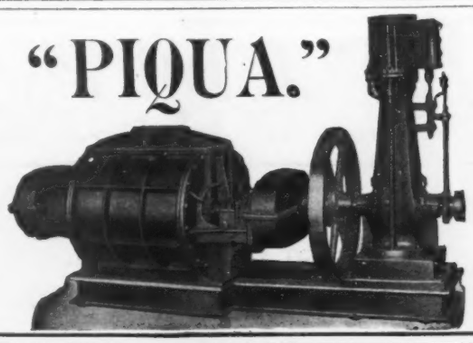
GAS EXHAUSTERS AND BLOWERS.

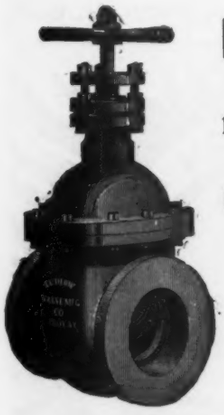
We have a full line of sizes for all standard pressures. The design, material and workmanship is A-1. Prompt Delivery and Reasonable Prices. WHY NOT give us YOUR requirements?

THE PIQUA BLOWER CO.,

PIQUA, OHIO.

"PIQUA."





THE

Ludlow Valve Mfg. Co.,

TROY, N. Y., U. S. A.

Double and Single Gate Valves, ¼" to 72",

—FOR—

Gas, Water, Steam, Oil, Ammonia, Etc.

HOT GAS VALVES A SPECIALTY.

Send for Catalogue.

QUINTARD IRON WORKS CO.,

Foot of Twelfth Street and East River, New York,

BENCH WORK,
CONDENSERS,
SHAVING SCRUBBERS,
CAST IRON FLANGED PIPE,
RIVETED STEEL PIPE.

FREDERICK W. FLOYD, Engineer.

ESTABLISHED 1856.

HENRY MAURER & SON,

Manufacturers of

High Grade Firebrick, Blocks, Tiles,

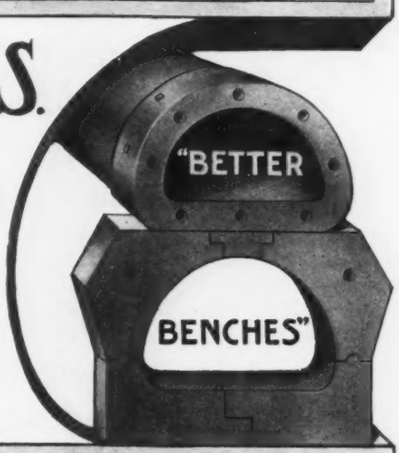
ETC.,

Works: Maurer, N. J. Office: 420 E. 23d St., N. Y. City

GAS BENCH CONSTRUCTION CO.

ST. LOUIS, MO.

COAL GAS BENCHES.
BENCH FILLINGS.
WATER GAS LININGS.



All Retorts and Settings Manufactured under the supervision of Our Own Chemist and Engineer.

All Workmanship, Material and Results Guaranteed.

PRACTICAL HANDBOOK ON GAS ENGINES, WITH INSTRUCTIONS FOR CARE AND WORKING OF THE SAME,

By G. LIECKFELD, C.E. Translated with Permission of the Author, by GEORGE M. RICHMOND, M.E. Price, $1.

For Sale by AMERICAN GAS LIGHT JOURNAL, 42 Pine Street, New York City.

IRONCLAD

THE 100% METER

No other meter at any price, has so many distinct advantages as the Ironclad, Cast Iron, Dry, Gas Meter.

Ask us to prove it.

Ironclads are furnished with straight or circular dials.

CATALOG 100 FREE.

Pittsburg Meter Co.
Main Office and Works,
East Pittsburg, Pa.

NEW YORK, 149 Broadway.
CHICAGO, 253 Madison Street.
KANSAS CITY, 6 West 10th Street.
SEATTLE, 8th and Madison streets.
SAN FRANCISCO, 149 New Montgomery Street.

MAKERS OF GAS METERS AND WATER METERS.

Big Business Calendar—FREE.

Humphrey Auto-Thermal Instantaneous Water Heaters

Have every known desirable feature helping to efficiency, economy, durability and absolute safety.

FULLY GUARANTEED.
PRICES LOW.
QUALITY AND SERVICE HIGH.

Will you help us sell them?

HUMPHREY CO.,
Kalamazoo, Mich., U. S. A.

LLOYD CONSTRUCTION COMPANY

GAS APPARATUS.

DETROIT—MICHIGAN

IT IS ABSOLUTELY NECESSARY

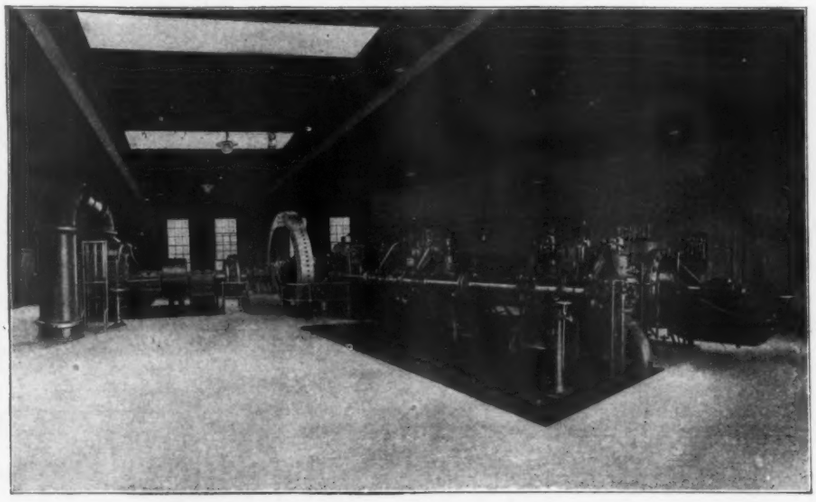
that people be reminded continually that you are ready to sell them the things they want. This is a big world, with lots of people in it, and you are easily forgotten if you don't keep buyers posted. What you should do is to tell them about your product to-day, remind them to-morrow, and keep on reminding them thereafter. If you do this, when the buyer is ready to place his order he will remember you. :: :: :: :: :: :: :: :: :: ::

An Advertisement in the AMERICAN GAS LIGHT JOURNAL

is the best and surest means of keeping your name and product before the buyers. :: ::

ROOTS' EXHAUSTERS.

A half century of experience, up-to-date engineering and shop facilities embodied in these **World Famous Gas Exhausters.**



An Installation for the Peoples Gas Light and Coke Co,, Chicago, Ill., handling 1,000,000 cu, ft. per hour, under six (6) pounds per square inch.

P. H. & F. M. ROOTS COMPANY,

HOME OFFICE: Connersville, Ind. **NEW YORK OFFICE: 120-122 Liberty St.** **CHICAGO OFFICE: 1547 Marquette Bldg.**

SEND FOR POCKET EDITION OF "ENGINEERS' PRACTICAL REFERENCE BOOK."

COAL TAR AND AMMONIA.

THIRD AND ENLARGED EDITION.

BY

GEORGE LUNGE, PH.D.

Price, $15. For Sale by

A. M. CALLENDER & CO., - - 42 Pine Street, New York City.

The "Gas World" Analyses of Municipal Gas Accounts, FOR 1908-1909,

AND

The "Gas World" Analyses of Gas Companies' Accounts, FOR 1908.

The former showing at a glance 69 accounts and the latter 55 accounts of Coal and Water Gas Companies, itemized under

Coal Carbonized, Gas Made and Sold, Yield of Residuals, Public Lamps, Mileage of Mains, Consumers, Price of Gas, Illuminating Power, Financial Results, Revenue.

Manufacturing Charges, Rates and Taxes, Distribution Charges, Management Charges, Bad Debts, Capital Paid Up, Capital per Ton and per Thousand, Reserve Funds, etc.

EVERY GAS ENGINEER AND MANAGER SHOULD HAVE A COPY OF THESE INVALUABLE AND UP-TO-DATE WORKS.

Price, $4 each. For Sale by AMERICAN GAS LIGHT JOURNAL, 42 Pine Street, New York City.

BRAY BURNERS HAVE BEEN USED FOR MORE THAN FORTY YEARS.

In that time they have been recommended and used by the leading gas experts, endorsed by the U. S. Government Inspectors of Gas, as well prominent State Inspectors.

To-day the Bray is the only high-grade, absolutely reliable open flame burner on the market.

W. M. CRANE COMPANY,

16, 18 and 20 West 32d Street, New York,

SOLE AGENTS FOR GEO. BRAY & CO., LEEDS, ENGLAND.

GEORGE ORMROD, Pres. & Treas. JOHN D. ORMROD, Supt. J. G. EBERLEIN, Secretary.

EMAUS PIPE FOUNDRY.

DONALDSON IRON COMPANY. EMAUS, PA.

MANUFACTURERS OF

CAST IRON PIPE AND SPECIAL CASTINGS

FOR WATER AND GAS.

Also, FLANGE PIPE, LAMP POSTS, Etc.

THE ECONOMICAL GAS APPARATUS CONSTRUCTION COMPANY, LIMITED,

Consulting Engineers.

Builders of UP-TO-DATE Machinery and Appliances for Coal and Water Gas Plants. :: :: :: :: ::

PLANS, SPECIFICATIONS AND ESTIMATES PREPARED.

AMERICAN OFFICE:
269 Front St., East, Toronto, Canada.

Celebrated Lux Gas Purifying Mass

Will Save 50 Per Cent. Labor.

Used in the Gas Works of Berlin, Kiel, Frankfort, Vienna, Amsterdam, Antwerp, London, Edinburgh, Copenhagen, Madrid, Seville, Barcelona, Rio de Janeiro and others. :: :: ::

Sole Importer, F. BEHREND,
54 Front St., New York.

Electric Gas Lighting,
By H. S. NORRIE.
Price, 50 Cents. For Sale by
AMERICAN GAS LIGHT JOURNAL, 42 Pine St., N. Y. City.

FRED. K. WELLS,

Manufacturers' Agent
FOR
SPECIAL GAS APPLIANCES,

Will Figure on Any Sort of Supplies for Gas Works in Manufacturing, Appliance or Distributing Divisions.

HEADQUARTERS, - - 1328 BROADWAY, NEW YORK CITY.

COMBINATION INDICATING AND RECORDING UNITS OF WILLIAM H. BRISTOL ELECTRIC

PYROMETERS,

ESPECIALLY ADAPTED FOR GAS MANUFACTURING PLANTS.

Indicating Instrument installed on Gauge Board for Gas Maker. Recording Instrument installed in Superintendent's Office.

Write for Special Bulletin No. 116 explaining applications of these Pyrometers in Gas Works of many Gas Manufacturing Companies. This new bulletin also gives lists of Gas Companies using the Wm. H. Bristol Electric Pyrometers.

THE BRISTOL CO, WATERBURY, CONN.

BRANCH OFFICES: NEW YORK. PITTSBURG. CHICAGO.

FOR SALE,

One Set of "King's Treatise on Coal Gas."
Three volumes. Edition 1882. Price, $100.
Address,
AMERICAN GAS LIGHT JOURNAL,
42 PINE STREET, NEW YORK CITY.

Alcohol, its Manufacture from Farm Products and De-Naturing. By F. B. WRIGHT.

Price, $1. *For Sale by*
A. M. Callender & Co., 42 Pine St., New York City.

Gas Engineer's Pocket-book, —BY— HENRY O'CONNOR.

Comprising Tables, Notes and Memoranda relating to the Manufacture, Distribution and Use of Coal Gas, and the Construction of Gas Works. PRICE, $3.50. For Sale by
A. M. Callender & Co., 42 Pine St., New York City

KERR MURRAY MANUFACTURING COMPANY,

Engineers and Manufacturers

APPARATUS FOR COAL GAS PLANTS,

SINGLE AND DOUBLE-LIFT GASHOLDERS
AND STEEL TANKS,

Latest Improved

ROTARY EXHAUSTERS, P. & A. TAR EXTRACTORS, AMMONIA WASHERS,

CONDENSING, SCRUBBING AND PURIFYING APPARATUS.

Street Specials and Valves.

ADDRESS:

KERR MURRAY MANUFACTURING COMPANY, {FORT WAYNE, IND.

SECOND EDITION.

THE DISTRIBUTION OF GAS,

By WALTER HOLE, C.E.,

Superintendent of the City of Leeds Gas Mains and Distribution Dept.

THE MOST COMPLETE WORK ON THE DISTRIBUTION OF GAS EVER PUBLISHED.

PROFUSELY ILLUSTRATED.

DEALING IN A COMPREHENSIVE MANNER WITH THE PROBLEMS AND PRACTICE OF GAS DISTRIBUTION UNDER HIGH AND LOW PRESSURES, FROM THE GASHOLDER TO THE CONSUMER, WITH A CHAPTER ON FUSION AND ELECTROLYSIS.

PRICE, $6. For Sale by

A. M. CALLENDER & CO., 42 PINE ST., NEW YORK CITY.

The "Gas World" Year Book, 1910,

Edited by JOHN DOUGLAS.

Technical Data, Diary and Handy Tables for Gas Engineers and Managers, Directory of English Gas Companies, etc.

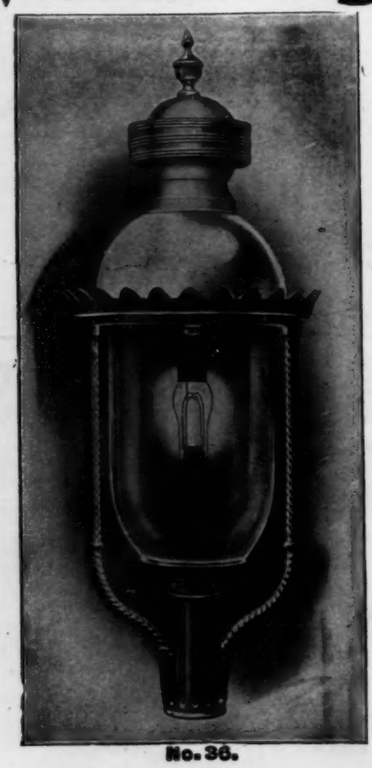
Price, $3. For Sale by

AMERICAN GAS LIGHT JOURNAL, 42 Pine St., New York City.

NEW YORK, 318 West 42d Street.
BOSTON, 820 Beacon Building.
PHILADELPHIA, Broad and Arch Streets.
ST. LOUIS, 712 Roe Building.
CHICAGO, 218 La Salle Street.
SAN FRANCISCO, 512 Oak Street.

WELSBACH STREET LIGHTING COMPANY

OF AMERICA



No. 36.

Controls and Operates the **Welsbach System of Street Lighting,**

Which includes its specially DESIGNED and PATENTED BURNER for PARK LIGHTING exclusively.

Uniformly SUCCESSFUL in 150 Cities and Towns.

By means of the Welsbach System of street lighting the superiority of GAS over electricity for street lighting has been fully demonstrated.

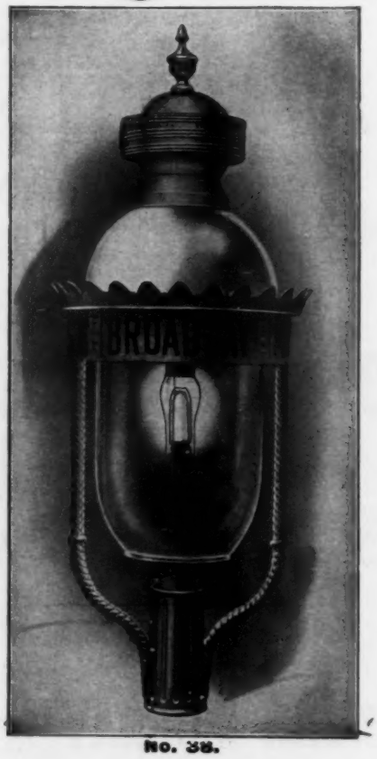
POINTS OF MERIT:

It is { Economical, Attractive, Successful, Up-to-date.

IT LIGHTS THE STREET.

Where there are no gas mains we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, and thereby supply a uniform light in all localities.

Correspondence Solicited from Gas Companies and Others Interested in Municipal and Outside Lighting.



No. 38.

REFLEXOLIERS.

No. 1031.

As an effective, efficient illuminant the Reflexolier marks a greater advance over the old methods of Gas Lighting than does the Tungsten over the Electric.

The Reflexolier is the ideal unit not only to hold present business, but best adapted to the needs of the Gas Company's new business department.

For the Reflexolier meets all the points of your competitors—and goes them several better in color value, maintenance cost, flexibility and attractive appearance.

Note:—No. 1031 *is the Standard Reflexolier*—No. 1032 *is designed to meet the demand for a more ornamental Fixture. Both finished in brushed brass*—*both furnished in 2, 3 and 4 lights.*

No. 1032.

Write for Discounts

WELSBACH COMPANY,

Gloucester, N. J. FACTORIES Columbus, O.

The United Gas Improvement Company,

Broad and Arch Streets, Philadelphia.

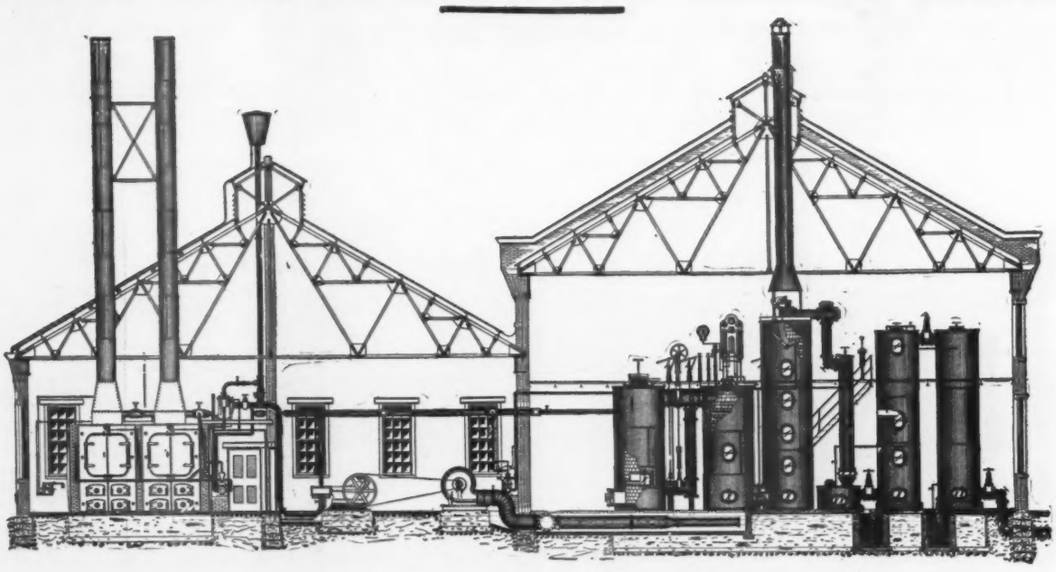
LESSEES, OPERATORS AND BUILDERS OF **GAS WORKS.**

Largest Builders of CARBURETTED WATER GAS PLANT IN AMERICA.

SOLE AMERICAN BUILDERS

OF THE

Standard Double-Superheater Lowe Water Gas Apparatus.



1909 CONTRACTS.

Belmar, N. J.	St. Albans, Vt.	Brockton, Mass.	Rosslyn, Va.
Abilene, Tex.	Jersey City, N. J.	Rockville, Conn.	Auburn, N. Y.
Pawtucket, R. I.	Everett, Mass.	Bay Shore, N. Y.	Lewiston, Me.
Middletown, Conn.	Burlington, Ia.	Sag Harbor, N. Y.	Moline, Ills.
Weatherford, Tex.	Des Moines, Ia.	Wilmington, Del.	Aurora, Ills.
New Bedford, Mass.	Pelham, N. Y.	Hammond, Ind.	Goldsboro, N. C.
Dallas, Tex.	Pleasantville, N. J.	Sumter, S. C.	Hoopeston, Ills.

TOTAL NUMBER OF SETS INSTALLED DURING YEAR 1909, ... 31
TOTAL NUMBER OF SETS INSTALLED TO JANUARY 1, 1910, ... 721
TOTAL DAILY CAPACITY TO JANUARY 1, 1910, ... 585,590,000 cu. ft.

Tar Extractors for Carburetted Water Gas
Photometrical Apparatus.
Gas Analysis Apparatus.
Recording Gauges.
Straight Standpipe System for Coal Gas Retorts.
Straight Standpipe Cleaners.
Waste Heat Boiler.
Hygrometer.
Meters for Regulating Air and Steam Supply to Water Gas Apparatus.
Emergency Kits for Persons Overcome by Gas.
Emergency Kits for Electric Shock.

Established 1856. Incorporated 1890.
CHAS. E. GREGORY, Prest. DAVID R. DALY, V.-Prest. & Treas.
H. D. ABERNETHY, Sec.

J. H. Gautier & Co.

Greene & Essex Streets,
Jersey City, N. J.

MANUFACTURERS OF

CLAY GAS RETORTS, FIRE CLAY TILES, FIRE BRICK and FIRE CLAY SPECIALTIES.

Ground Fire Clay, Fire Sand and Ground Fire Brick in Barrels and Bulk.

SOLE MANUFACTURERS OF THE

FLEMMING GENERATOR GAS FURNACE

GEROULD'S IMPROVED RETORT CEMENT

A Cement of great value for patching retorts, putting on mouthpieces, making up all bench-work joints, lining blast furnaces and cupolas. This cement is mixed ready for use Economic and thorough in its work. Fully warranted to stick.

Price List, f.o.b. NEW CASTLE, PA.

In Casks, 400 to 800 pounds, at 5 cents per pound.
In Kegs, 100 to 200 " " 6 " "
In Kegs less than 100 " " 7 " "

C. L. GEROULD,
29 North Mill St., New Castle, Pa.

KRATER-DINAS RETORT CEMENT.

Universally accepted to be the best cement for patching and repairing retorts, making up bench work, etc. Advantages: Powdered form; only mix with water; no waste; too much mixed, apply water and use the next time; adheres very easy; does *not* fall out by decarbonization. We guarantee or take back. Many re-orders and recommendations from America, Germany, France, Belgium, etc. Write for price and testimonials.

ERNST STRASSBURGER, Sole Importer,
2630 Lincoln Avenue, Chicago, Ills.

"BEST BY TEST."

ESTABLISHED 1868.

L. N. RANCKE, V. Pres. & Mgr. E. L. RIEHA, Engineer.

BALTIMORE RETORT & FIRE BRICK COMPANY.

COAL GAS BENCHES.

HORIZONTAL RETORTS.
INCLINED RETORTS.
VERTICAL CHAMBERS.

WALDO BROS., 102 Milk St., BOSTON, MASS.,
NEW ENGLAND AGENTS.

JOHN DELL,
President and General Manager.

MISSOURI FIRE BRICK CO.,

ESTABLISHED 1882.

MANUFACTURERS OF

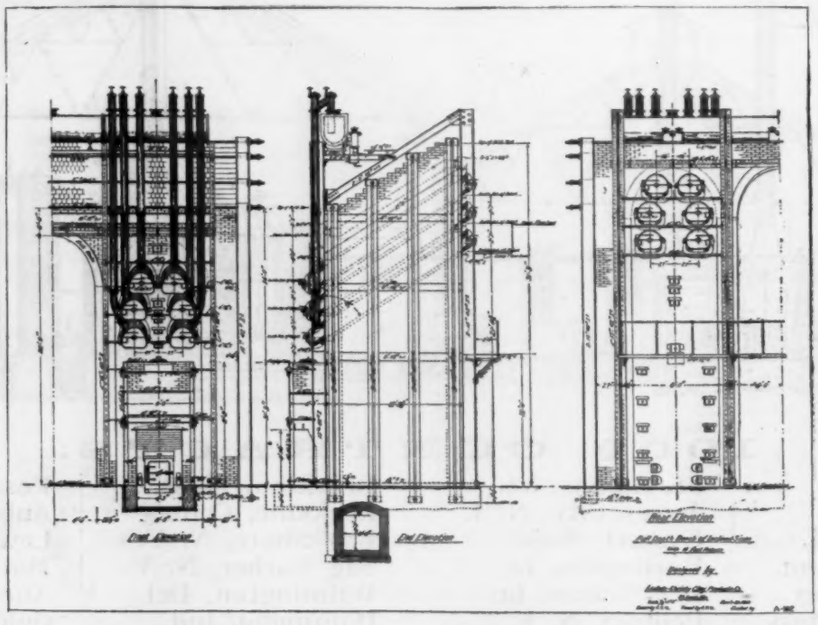
Gas Retorts, Bench Settings, Fire Brick, Cupola Linings, Etc.

We are the **Exclusive Agents** *for the* **Mitchell Patent Benches,** *Constructed with Half or Full Depth Furnaces, to Burn either Coal or Coke, and Arranged for Front or* **Rear Clinkering.** *The* **Mitchell** *is the* **Original Coal Firing Bench.** *We also Erect Plain Benches with* **One** *to* **Six Retorts.**

YOUR CORRESPONDENCE IS RESPECTFULLY SOLICITED.

City Office: *411 Olive Street, Continental Bank,* ST. LOUIS, MO.

LOW FUEL CONSUMPTION.
HIGH MAKE PER RETORT.



EXTRA HEAVY CONSTRUCTION, BOTH BRICKWORK AND IRONWORN.

OUR STANDARD FULL-DEPTH BENCH OF INCLINED SIXES, WITH RETORTS 15 FEET LONG.

"LACLEDE-CHRISTY,"

ST. LOUIS, MO.

ASK FOR ESTIMATES.

EXPERT INSPECTION of Holders and Other Structures During Construction.
ECONOMIC DESIGN of Steel Structures, Reinforced Concrete, Masonry and Foundations.
CHAMBERS & HONE, Consulting Engineers, ... 1 Liberty Street, New York City.

Bronder Patent Stoking Machinery.

Three-Scoop and Three-Rake Charging and Discharging Machines are operating in New York, Newark, N. J., Philadelphia, Worcester, Mass., Mt. Vernon, N. Y., Toronto and Montreal, Canada, Detroit, Seattle, Rochester and St. Louis.

Four-Scoop and Four-Rake Charging and Discharging Machines are operating in Detroit, Mich., and Cincinnati, Ohio. These are the only machines that will draw or charge simultaneously 3 or 4 retorts (vertically) and handle from 42 to 60 retorts in from 25 to 30 minutes, lid opening and closing and filling of furnaces included.

Hot Coke Conveyor, Quencher and Steam Exhauster, operating in Toronto, Canada, working in water-sealed flue, rollers being protected from heat and grit.

COAL CRUSHERS, CONVEYORS AND BINS. TURNTABLES FOR MACHINES.

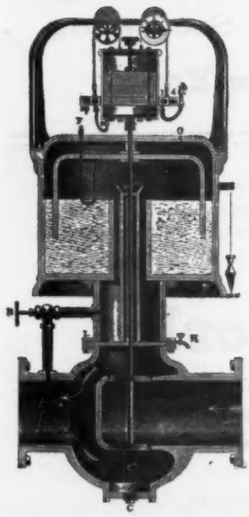
Labor-Saving Machines for Handling Coal and Coke from Coal Cars to Coke Yard or Bins. Coke Screening and Measuring Plants a Specialty.

G. A. BRONDER,

Contracting Engineer and Builder,

229 BROADWAY, NEW YORK.

CONNELLY IRON SPONGE AND GOVERNOR CO.,



Automatic, Balance, High Pressure and Service Governors,

Unison Telemetric Pressure Gauge,

Iron Sponge, Purifying Material for Gas Purification, Manufacturers of Jones Jet Photometers, The National Smoke and Ammonia Helmet, Sulphur Testers, High and Low Pressure House Governors. .. ..

Wide Experience in High Pressure Installation and Extension.

PACIFIC COAST AGENT: VAN E. BRITTON, SAN FRANCISCO, CAL.

50 CHURCH ST., NEW YORK CITY.
295 WEST 22D ST., CHICAGO, ILLS.

12-Inch High Pressure Governor.

REYNOLDS' GAS REGULATOR COMPANY,

ANDERSON, IND., U. S. A.

We make all sizes for all classes of reduction,

Double and Single District Stations,

And Individual Service Governors for Reducing High Pressure.

HOLDER GOVERNORS

And Low Pressure Regulators, all of the Dry Diaphragm type.

English Agents:
THE BRYAN DONKIN CO., LTD., Chesterfield, England.

Write for Catalog.

Combination Governor.
(Governor and Mercury Seal.)

FIELD'S ANALYSIS FOR THE YEAR 1908.

PRICE, $5. FOR SALE BY

AMERICAN GAS LIGHT JOURNAL, 42 Pine St., New York City.

COAL TAR AND AMMONIA,

By GEORGE LUNGE, PH.D. Third and Enlarged Edition.
Price, $15. For Sale by
AMERICAN GAS LIGHT JOURNAL, 42 Pine St., New York City.

JAMES D. PERKINS, President. F. SEAVERNS, Treasurer.

THE PERKINS COMPANY,

228 and 229 Produce Exchange, New York City.

OCEAN MINE YOUGHIOGHENY GAS COAL,
OLD KENTUCKY SHALE AND O. K. BOGHEAD.

BERWIND-WHITE COAL MINING COMPANY'S

Ocean Westmoreland Gas Coal.

Offices:
Washington Building, New York.
Betz Building, Philadelphia.

STRICTLY High Grade. . . . .
Carefully Prepared.
For Gas Making or
Heavy Steaming. .

A. C. M. AZOY, General Agent, 1 Broadway, New York.

PETER YOUNG, President. ESTABLISHED 1864. N. A. YOUNG, Secretary and Treasurer

Works.
LOCKPORT STATION, PA.

JAMES GARDNER, JR., CO.,

Successor to WILLIAM GARDNER & SON.

Address all communications to
JAMES GARDNER, JR., CO., Bolivar, Pa.

Fire Clay Goods for Gas Works.

SCIENTIFIC BOOKS.

GAS MANUFACTURE. By W. J. A. Butterfield. Vol. I., Material and Processes. $2.50. Vol. II., In Preparation.

MODERN GAS ENGINES AND PRODUCER GAS PLANTS. By R. E. Mathot. $2.50.

COAL TAR AND AMMONIA. By George Lunge. $15.

GAS ANALYSIS. By Dr. W. H. Birchmore. $1.25.

ELECTRIC GAS LIGHTING. By H. S. Norrie. 50 cents.

GAS ANALYST'S MANUAL. By J. Abady. $6.50.

GAS ENGINE DESIGN. By C. Edward Lucke, Ph.D. $3.

THE "GAS WORLD" YEAR BOOK, 1908. Edited by John Douglas. $3.

GAS AND GAS WORKS. By Hughes and O'Connor. $2.50

POOLE ON FUELS. By Herman Poole. $3.

GAS ENGINEER'S POCKET-BOOK. By Henry O'Connor $3.50.

PRACTICAL TREATISE ON HEAT. By Thomas Box. 2d edition. $5.

CHEMICAL TECHNOLOGY: Vol. I., *Fuel and Its Applications*, $5. Vol. II., *Lighting*, $4.

IRONWORK: Practical Designing of Structural Ironwork. By H. Adams. $3.50.

SELF-INSTRUCTION FOR STUDENTS IN GAS MANUFACTURE. Elementary, advanced and constructional, each, $1.50.

LIQUID FUEL FOR MECHANICAL AND INDUSTRIAL PURPOSES. By E. A. Brayley Hodgetts. $2.50.

GAS ENGINE. By F. R. Hutton, E.M., Ph.D., Sc.D. $5.

TECHNICAL GAS ANALYSIS. By Winkler & Lunge. $4.

CHEMISTRY OF GAS MANUFACTURE. By Harold M. Royle, F.C.S. $4.50.

HEMPEL'S GAS ANALYSIS. $2.25

PRACTICAL TESTING OF GAS AND GAS METERS. By C. Stone. $3.50.

GAS ENGINE THEORY AND DESIGN. By A. C. Mehrtens, M.E. $2.50.

GAS, GASOLINE AND OIL ENGINES. By Gardner D. Hiscox. Fifteenth edition. $2.50.

PRACTICAL HANDBOOK ON GAS ENGINES. By G. Lieckfeld. $1.

HEAT A MODE OF MOTION. By John Tyndall. $2.50.

THEORY OF HEAT. By J. Clerk-Maxwell. $1.50.

AMMONIA AND AMMONIUM COMPOUNDS. By Dr. R. Arnold. $2.

GASFITTERS' QUESTION BOOK, WITH ANSWERS. By Albert Dunbar, S.B. $1.60.

A TREATISE ON THE COMPARATIVE COMMERCIAL VALUES OF GAS COALS AND CANNELS. By D. A. Graham. $1.50.

A TEXT BOOK OF INORGANIC CHEMISTRY. By Prof. Victor Von Richter. $2.

ILLUMINATING AND HEATING GAS. By W. Burns. $1.50

HANDBOOK FOR MECHANICAL ENGINEERS. By H. Adams. $2.50.

FINANCES OF GAS, ELECTRIC LIGHT AND POWER ENTERPRISES. By Wm. D. Marks. $4.

STANDARD REDUCTION FACTORS FOR GASES. By Helon Brooks MacFarland. $1.50.

PRACTICAL PLUMBING. By P. J. Davies. Vol. I., $3. Vol. II., $4.50.

AMERICAN SANITARY PLUMBING. By James J. Lawler. $2.

HENLEY'S 20TH CENTURY BOOK OF RECIPES, FORMULAS AND PROCESSES. By Gardner D. Hiscox. $3.

TREATISE ON MASONRY CONSTRUCTION. Baker. $5.

THE "GAS WORLD" ANALYSES OF MUNICIPAL GAS ACCOUNTS for 1907-8, and the "GAS WORLD" ANALYSES OF GAS COMPANIES' ACCOUNTS for 1908. Each, $4.

PUBLIC LIGHTING BY GAS AND ELECTRICITY. By W. J. Dibdin. $8.

FIELD'S ANALYSIS, 1908. $5.

THE MACBETH CALCULATOR FOR THE SOLUTION OF EVERY ILLUMINATION CALCULATION. $6.50.

AMERICAN GAS ENGINEERING PRACTICE. By M. Nisbet Latta. $4.50.

JONES JET PHOTOMETER, for Coal or Water Gas. Each $10.

ELECTRICITY.

ELECTRIC WIRING DIAGRAMS AND SWITCHBOARDS. By Newton Harrison, E.E. $1.50.

CARE AND MANAGEMENT OF ELECTRIC POWER PLANTS. By Norman H. Schneider. Cloth, $1.50. Leather, $2.50.

INDUSTRIAL PHOTOMETRY, with Special Application of Electric Lighting. By A. Palaz, Sc.D. $4.

ELEMENTS OF ELECTRIC LIGHTING, Including Electric Generation, Measurement, Storage and Distribution. By Philip Atkinson. $1.50.

ELECTRIC TRANSMISSION OF ENERGY. By G. Kapp. $3.50.

ELECTRICIAN'S POCKET-BOOK. By Monroe and Jamieson. $2.50.

DYNAMO BUILDING. By F. W. Walker. 50 cents.

DOMESTIC ELECTRICITY FOR AMATEURS. By E. Hospitalier. $2.50.

PRACTICAL MANAGEMENT OF DYNAMOS AND MOTORS. $1.

PRACTICAL GUIDE TO THE TESTING OF INSULATED WIRES AND CABLES. $1.

ELECTRIC LIGHTING, by Francis B. Crocker. $3.

ELECTRIC LIGHT FITTING. $2.

PRACTICAL ELECTRICITY. $2.50.

ELECTRICITY FOR ENGINEERS. $2.50.

ELECTRICITY, Its Theory, Sources and Applications. By John T. Sprague. $6.

The above will be forwarded upon receipt of price. If sent by mail or express, postage or express charges must be added to above prices. We take especial pains in securing and forwarding any other Works that may be desired, upon receipt of order. All remittances should be made by check, draft, or post office money order. No books sent C.O.D.

AMERICAN GAS LIGHT JOURNAL, 42 Pine Street, New York City.

KELLER ADJUSTABLE COKE CRUSHER.

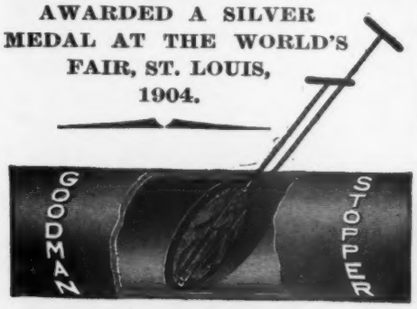
Strong, Simple, Durable. Will Crush any Size Desired.

C. M. KELLER.

Columbus, Ind.

Correspondence Solicited.

AWARDED A SILVER MEDAL AT THE WORLD'S FAIR, ST. LOUIS, 1904.



AGENTS.

Pacific Coast—VAN E. BRITTON, 269 Monadnock Building, San Francisco, Cal.

Great Britain—PARKER & LESTER, Old Kent Road, London.

MANUFACTURED BY

SAFETY GAS MAIN STOPPER CO.,

257-263 East 133d Street,

NEW YORK CITY.

PATENTS, TRADE MARKS, COPYRIGHTS.

ROYAL E. BURNHAM,

Solicitor of Patents and Counsellor in Patent Causes.

833 Bond Building, Washington, D. C.

Send for Pamphlet on Patents.

EDMUND H. McCULLOUGH, President. H. C. ADAMS, 1st Vice President. CHAS. F. GODSHALL, 2d Vice-Pres. & Treas. HENRY WHARTON, Secretary. C. B. NICHOLS, Assistant Secretary.

THE WESTMORELAND COAL CO.

Chartered 1854.

Mines situated on the Pennsylvania and the Baltimore and Ohio Railroads, in Westmoreland County, Pa.

POINTS OF SHIPMENT:

PHILADELPHIA, BALTIMORE, SOUTH AMBOY, N. J., WATKINS (SENECA LAKE), N. Y.

Since the commencement of operations by this Company its well-known Coal has been largely used by the Gas Companies of New England and the Middle States, and its character is established as having no superior in gas-giving qualities, and in freedom from sulphur and other impurities.

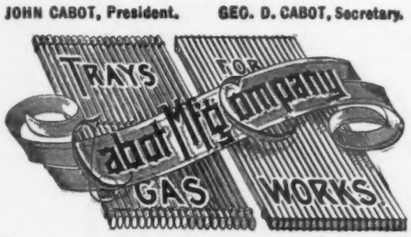
Principal Office, 224 South 3d St., Phila., Pa.

GAS MAINS—SERVICE PIPES.

Their installation for High or Low Pressure is the work in which we have specialized for years. Because of our Facilities and Experience, many Gas Companies prefer to contract with us for such work, rather than to execute it themselves. It proves to be as cheap in the end. We solicit inquiries. SULLIVAN BROS.,

Telephone Connection. 11 Main St., Flushing, N. Y.

JOHN CABOT, President. GEO. D. CABOT, Secretary.



1412-1428 Adams Street, Hoboken, N. J.

PURIFIER AND SCRUBBER TRAYS.

Church's Patent Trays,

Reversible; Strongest; Most Easily Repaired.

We also Supply the Cheapest and Strongest

Reversible Bolted Trays.

Special Trays for Iron Oxide in Either Style.

GAS TAPPING MACHINES

—FOR—

Drilling and Tapping Pipe under Pressure

WITHOUT ANY ESCAPE OF GAS.

They are Strong and Compact.

Size of Combination Drills and Taps ¾ to 4-inch.

Machines Sent to any Gas Company for Thirty Days' Trial.

Send for Circulars.

Geo. Light,

DAYTON, O.

Standard Oil Company,

GAS NAPTHA DEPARTMENT.

GAS NAPTHA.

GAS OIL.

Correspondence Solicited.

26 Broadway, New York City.

DAVIS & FARNUM MANUFACTURING CO.,

Waltham, Mass.

GAS HOLDERS

Steel Tanks for Naptha Storage, Machinery for Coal and Water Gas Plants.

H. M. BYLLESBY & COMPANY

(INCORPORATED).

GAS ENGINEERS,

DESIGN, CONSTRUCT AND OPERATE
COMPLETE COAL, WATER AND CRUDE OIL GAS PLANTS.

EXAMINATIONS AND REPORTS.

218 LA SALLE STREET, CHICAGO.

Oklahoma City, Okla. Mobile, Ala. San Diego Cal.

ALEX. C. HUMPHREYS, President.
EMILE GUILLAUDEU, Treasurer.
ROBT. O. LUQUEER, Secretary.
HOWARD E. WHITE, General Counsel.

EUROPEAN CORRESPONDENTS,
HUMPHREYS & GLASGOW,
LONDON. — BRUSSELS.

HUMPHREYS & GLASGOW, INC.,

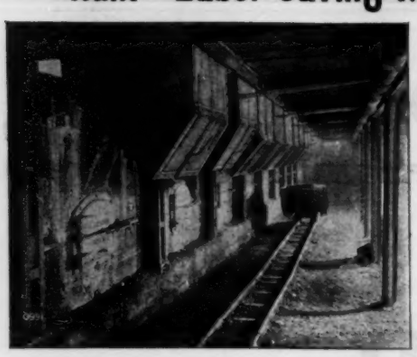
CONSULTING ENGINEERS.

ADVICE AS TO EXTENSION, MANAGEMENT AND RECONSTRUCTION OF GAS AND ELECTRIC PLANTS.

COMPLETE EXAMINATIONS MADE. ~ ~ ~ PROPERTIES PURCHASED.

CITY INVESTING BUILDING, 165 BROADWAY, NEW YORK.

"Hunt" Labor-Saving Machinery for Gas Works.



McDonald-Mann Quenching Chutes, Spokane Gas Light Co.

McDONALD-MANN QUENCHING CHUTES FOR COOLING COKE.

Where this system is in use, there is no injury to the chutes and steel work of the building, through corrosion due to the action of the gaseous vapors, unavoidable with the old method of cooling the coke on the floor.

The coke can be handled in ordinary cars, as it is received from the chutes so cool there is no warping, which would necessitate cars of special construction.

At one gas works the chutes which we installed there six years ago have been steadily in operation ever since, and still are, without needing any repairs.

Bulletin A-3 Describes this System and Copy will be Sent on Request.

Sole Manufacturing and Selling Agents,

C. W. HUNT COMPANY, Established 1872.

General Offices and Works. . . . . WEST NEW BRIGHTON, NEW YORK.
NEW YORK OFFICE, 45 BROADWAY.

HENRY I. LEA,

CONSULTING GAS ENGINEER.

DESIGN---CONSTRUCTION---MANAGEMENT
OF
GAS PLANTS
FOR
CITY SUPPLY---
POWER DEVELOPMENT---
INDUSTRIAL HEATING.

EXAMINATIONS AND REPORTS.

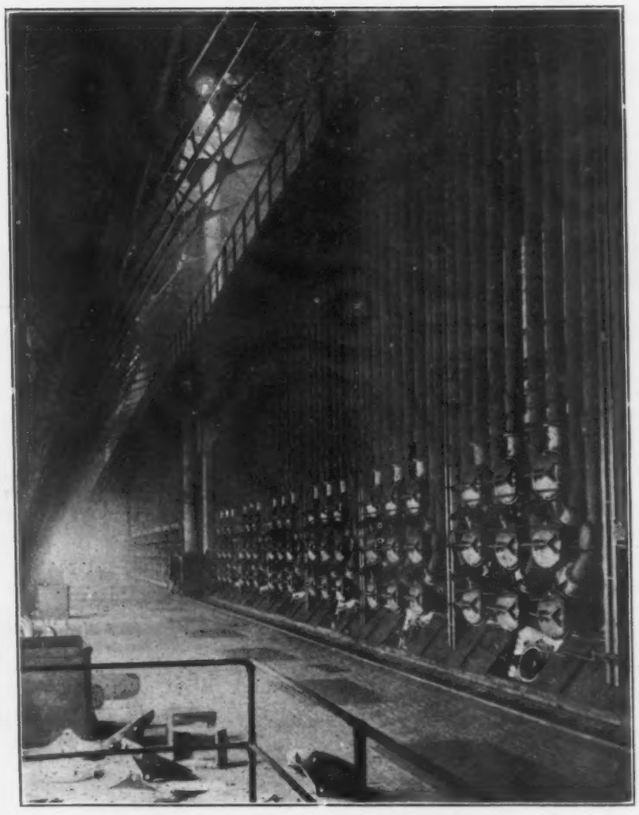
ROOKERY BUILDING, CHICAGO.

FIELD'S ANALYSIS FOR THE YEAR 1908.

An Analysis of the Principal Gas Undertakings in England, Scotland and Ireland; being the 40th year of publication. Compiled and arranged by JOHN W. FIELD, Sec'y and Gen. Mgr. of The Gas Light and Coke Company, London. Price, $5. For Sale by

AMERICAN GAS LIGHT JOURNAL, 42 Pine St., N. Y. City.

THE BARTLETT HAYWARD CO.
ENGINEERS & FOUNDERS.
BALTIMORE. NEW YORK.
COAL & WATER GAS PLANTS
GAS HOLDERS



DISCHARGING SIDE OF INCLINED RETORTS.

R. D. WOOD & CO.,

400 CHESTNUT ST., PHILADELPHIA,

MANUFACTURERS OF

Cast Iron Pipe.

HEAVY LOAM CASTINGS,

Dunham Specials,

Hydraulic Work,

LAMP POSTS, VALVES, ETC.,

Gas Power Plants with Producers.

BUILDERS OF

Gasholders.

Single or Multiple Lifts, with or without Metal Tanks.

PURIFIERS, CONDENSERS, SCRUBBERS, BENCH WORK.

Cutler's Patent Freezing Preventer for Holder Cups.

THE FULTON GAS PRESSURE GOVERNORS

For Artificial or Natural Gas.

For District or Individual Service.

Our Improved **Duplex Sensitive Governor** for district service will reduce high pressure gas to inches of water without variation. Absolutely safe and reliable. No complicated mechanism to get out of order. No auxiliary regulators or other devices to assist the main governor required. The most simple and perfect governor ever placed on the market. We also manufacture Holder Governors, Compressor Governors and Individual Service Governors for any inlet and outlet pressure.

More than 20 years' experience with the largest gas companies. Send for Catalog.

THE CHAPLIN-FULTON MFG. CO.,

VAN E. BRITTON, Pacific Coast Agent, Monadnock Bldg., San Francisco, Cal. 28-34 PENN AVE., PITTSBURGH, PA.

BOOKS FOR GAS MEN.

LIQUID AND GASEOUS FUELS,
By Vivian B. Lewes.
334 pages. . . . . Price, $2.

THE GAS ENGINE,
By Forrest R. Jones. 447 pages and 142 cuts. Price, $4.

HEATING,
By W. J. Baldwin.
Price, ... $2.50.

PUBLIC LIGHTING BY GAS and ELECTRICITY, By W. J. Dibdin. 528 pages. About 150 illustrations. Price, . . $8.

AUDEL'S GAS ENGINE MANUAL.
469 pages. 156 illustrations.
Price, ... $2.

GAS MANUFACTURE,
By W. J. A. Butterfield.
Price, ... $2.50.

HANDBOOK ON GAS ENGINES,
By G. E. Lieckfeld, C.E. Translated by George M. Richmond, M.E. Price, $1.

GAS AND GAS WORKS,
By Hughes and O'Connor.
Price, ... $2.50.

CHEMISTRY OF GAS MANUFACTURE,
By Harold M. Royle, F.C.S.
Price, ... $4.50.

MODERN COKING PRACTICE,
By T. H. Byrom and J. E. Christopher.
168 pages. Illustrated. . . Price, $3.50.

HEAT, ENERGY AND FUELS,
By Oskar Nagel. 306 pages and 118 illustrations. Price, $3.

PRODUCER GAS AND GAS PRODUCERS,
By Samuel S. Wyer. 295 pages. Price, $4.

THE MACBETH CALCULATOR for the Solution of Every Illumination Calculation. Price, . . . $6.50.

RADIATION, LIGHT AND ILLUMINATION, By Dr. C. P. Steinmetz.
300 pages. 127 illustrations. Price, $3.

GAS MANUFACTURE FOR STUDENTS,
By John Hornby.
Price, ... $1.50.

COAL TAR AND AMMONIA,
By George Lunge.
Price, ... $15.

GAS ANALYST'S MANUAL,
By Jacques Abady.
Price, ... $6.50.

SELF-INSTRUCTION FOR STUDENTS,
Elementary, Advanced, Constructional.
Price, ... Each, $1.50.

GAS PIPING AND GAS LIGHTING,
By W. P. Gerhard.
310 pages. . . . . Price, $3.

GAS POWER,
By F. E. Junge, M.A., C.E., M.E.
548 pages. . . . . Price, $5.

GAS, GASOLINE AND OIL ENGINES,
Including Producer Gas Plants.
By Gardner D. Hiscox, M.E. Price, $2.50.

PRACTICAL TESTING OF GAS AND GAS METERS,
By C. H. Stone. Price, ... $3.50.

GAS ENGINE THEORY AND DESIGN,
By A. C. Mehrtens.
256 pages. 241 illustrations. Price, $2.50.

THE DISTRIBUTION OF GAS,
By Walter Hole.
Second Edition. Illustrated. Price, . $6.

MODERN RETORT SETTINGS,
By G. P. Lewis.
Price, ... $1.50.

ART OF ILLUMINATION,
By Dr. Louis Bell.
Price, ... $2.50.

GAS COMPANIES' BOOKKEEPING,
By Brearley and Taylor.
Price, ... $4.50.

We will be Glad to Furnish Any Engineering Book.

SEND CHECK, DRAFT, POST OFFICE or EXPRESS MONEY ORDER.

AMERICAN GAS LIGHT JOURNAL - - 42 PINE STREET, NEW YORK CITY.

ESTABLISHED 1851.

THE STACEY MANUFACTURING COMPANY,

CINCINNATI,

Designers, Manufacturers and Builders of

Gas Holders,

Plate and Structural Work,

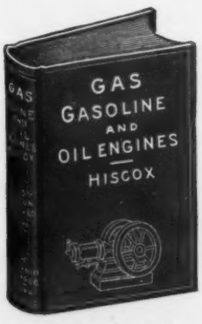
Tanks of Every Description,

All Ironwork and Apparatus Required in a Gas Plant.

THE "CHOLLAR" SYSTEM OF GAS PURIFICATION.

INQUIRIES SOLICITED.

JUST PUBLISHED, 15TH EDITION, REVISED, ENLARGED AND RESET.



Gas, Gasoline and Oil Engines,

INCLUDING GAS PRODUCER PLANTS,

By GARDNER D. HISCOX, M.E.

Author of "MECHANICAL MOVEMENTS," "COMPRESSED AIR," Etc.

PRICE, - - - - - $2.50.

The only complete American book on the subject for Gas Engine Owners, Gas Engineers and intending purchasers of gas engines, treating fully on the construction, installation, operation and maintenance of gas, gasoline, kerosene and crude petroleum engines.

The new rewritten, enlarged and revised 15th edition of this work has been prepared to meet the increasing demand for a thorough treatise on the subject. Its 450 pages give general information for everyone interested in this popular motive power and its adaptation to the increasing demand for a cheap and easily managed motor requiring no licensed engineer. It is fully illustrated by 351 Engravings and Diagrams. For sale by

A. M. CALLENDER & CO., - - - - - 42 Pine Street, New York City.

Gas Companies' Bookkeeping,

1906 EDITION,

By JOHN H. BREARLEY and BENJAMIN TAYLOR.

A Practical Treatise on the Keeping of Gas Companies' Accounts,

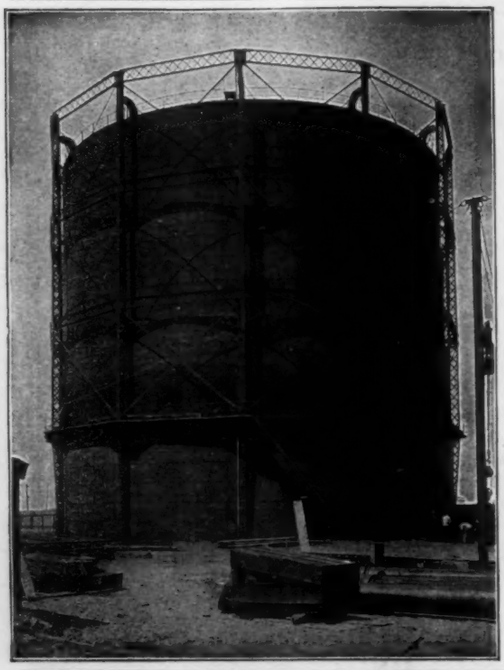
WITH USEFUL

FORMS FOR GAS UNDERTAKINGS.

PRICE, CLOTH, $4.50, MOROCCO, $6.50.

FOR SALE BY

AMERICAN GAS LIGHT JOURNAL, 42 Pine Street, New York City.



JOHN FOWLER, President. J. SCOTT FOWLER, Vice-Pres. & Treas.

DEILY & FOWLER MFG. CO.,

39 Laurel Street, Philadelphia, Pa.

ESTABLISHED 1842. INCORPORATED 1908.

BUILDERS OF

GASHOLDERS,

Single-Lift or Telescopic,

With or Without Steel Tanks.

Oil Storage Tanks, Water Tanks, Etc.

ESTIMATES CHEERFULLY FURNISHED.

CORRESPONDENCE SOLICITED.

ASK ABOUT OUR

VICTOR BLOWERS,

For Use with Industrial Gas Appliances.

WE ALSO SOLICIT YOUR INQUIRIES FOR

GAS EXHAUSTERS,
HIGH PRESSURE GAS PUMPS,
BOOSTERS,
HUNTOON GOVERNORS,
PRESSURE REGULATORS,
BLAST VALVES,
ETC., ETC.

THE CONNERSVILLE BLOWER COMPANY,

Connersville, Indiana, U. S. A.

NEW YORK OFFICE, 50 Church Street. CHICAGO OFFICE, 536 Monadnock Building.

AMERICAN GAS ENGINEERING PRACTICE,

By M. NISBET LATTA, C.E. PRICE, $4.50.

For Sale by

AMERICAN GAS LIGHT JOURNAL, 42 Pine St., New York City.

D. McDONALD & CO.,

971-997 BROADWAY, ALBANY, N. Y.,

MANUFACTURERS OF

DRY GAS METERS, STATION METERS, PREPAYMENT METERS, METER PROVERS AND GAUGES.

THE GLOVER PREPAYMENT METER,

Simple, Strong, Satisfactory.

THE HINMAN STATION METER DRUM,

The greatest advance that has been made in 20 years in the ACCURATE and ECONOMICAL measurement of gas in large quantities. :: :: ::

NEW YORK OFFICE: 561 West 47th Street. | ALBANY OFFICE: 991 Broadway. | CHICAGO OFFICE: Jefferson and Monroe Streets.

We can meet your requirements for STATION METERS

On all capacities from 1,500 to 500,000 cu. ft. per hour.

One-half the Cost—One-tenth the Space of Old Style Wet Meters.

When in Need of Station Meters Write

ROTARY METER COMPANY,
280 Broadway, NEW YORK.

Our Literature and all information will be sent on request.

The Sprague Meter Co.

Manufacturers of

Cast Iron Gas Meters

for

Artificial or Natural Gas

Plain or Prepayment

Lower in first cost and cheaper to maintain than any meter on the market.

Write us for particulars.

The Sprague Meter Company

203 Water St., Bridgeport, Conn.

NATHANIEL TUFTS METER COMPANY,

455 Commercial St., Boston, Mass.

PREPAYMENT GAS METERS,
WET AND DRY GAS METERS, STATION METERS, ETC.

REPAIRING OF ALL MAKES OF METERS, AND FITTED WITH OUR PREPAYMENT ATTACHMENT.

B METERS.

INCREASED CAPACITY.
INCREASED EFFICIENCY.

PREPAYMENT METERS, STATION METERS, METER PROVERS, ETC.

PROMPT AND CAREFUL ATTENTION TO ALL REPAIR WORK.

MARYLAND METER COMPANY,
BALTIMORE.—CHICAGO.

YOU NEED ONE OR MORE OF OUR COMPLAINT METERS.

METERS, Plain and Prepayment,

For Artificial or Natural Gas.

Repairing All Makes and Attachments Added if Desired.

SPECIAL METERS FOR ACETYLENE.

KEYSTONE METER COMPANY,

ROYERSFORD, PA.

JUDICIOUS ECONOMY IS EFFECTED

BY USING

5-L. IMPROVED GAS METERS.

LOW SPEED, LARGE DIAPHRAGMS, STRONGER CONSTRUCTION, LARGER CAPACITY.

FITTED WITH

THE NEW YORK PREPAYMENT ATTACHMENT.
STEEL BOX AND CABINET LOCK.

NEW YORK IMPROVED METER CO., 306-310 East 47th St., New York City.

LOWELL BRANCH, Broadway & School St., Lowell, Mass. PACIFIC COAST AGENT, Northwest Gas Equipment Co., Portland, Ore.

AMERICAN METER CO.,

NEW YORK, ST. LOUIS, PHILADELPHIA, SAN FRANCISCO, CHICAGO,

Wet and Dry Gas Meters, Station Meters, Meter Provers, Photometrical Apparatus, Gauges,

PREPAYMENT METERS,

REGULAR METERS REFITTED WITH PREPAYMENT ATTACHMENTS.

HELME & McILHENNY,

Established 1848. **1339 to 1349 Cherry Street, Philadelphia, Pa.**

MANUFACTURERS OF

Wet and Dry Gas Meters, Station Meters, Provers, Gauges, Etc.

METERS REPAIRED

PREPAYMENT GAS METERS.

Our Own Patents. Strong. Simple. PROMPT ATTENTION. CORRESPONDENCE SOLICITED.

METRIC METAL COMPANY,

MAKERS OF

GAS METERS for NATURAL and ARTIFICIAL GAS.

Special Attention given to Repairing METERS of all Makes.

FACTORY AT ERIE, PA.

ALCOHOL, Its Manufacture from Farm Products and De-Naturing,

By F. B. WRIGHT.

A NEW AMERICAN BOOK.

CONTENTS.

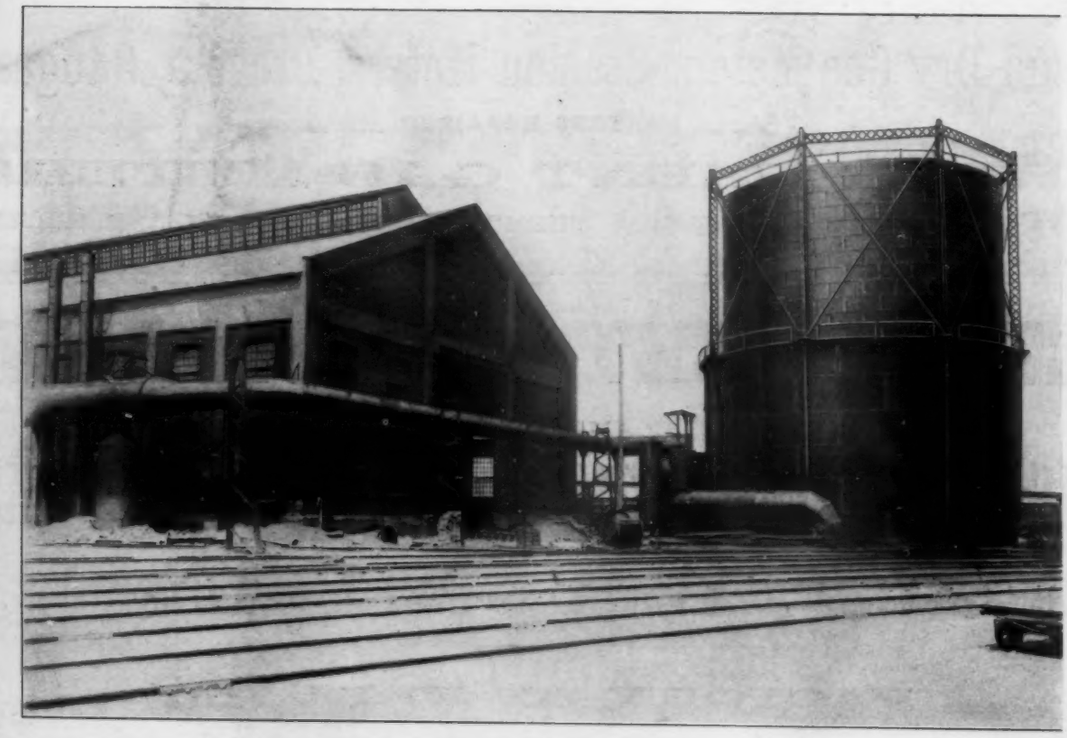
Chapter 1. Alcohol, its various forms and sources.
" 2. Mashing, cooling and fermentation in general.
" 3. Distillation, simple forms of stills, the production of Alcohol from wine.
" 4. Malting.
" 5. Alcohol from Potatoes, mashing, fermentation, distillations, Continuous stills.
Chapter 6. Alcohol from Grain.
" 7. Alcohol from Beets.
" 8. Alcohol from Sorghum and Molasses.
" 9. De-natured Alcohol and its Commercial uses.
" 10. Alcoholometry. Index.

Fully Illustrated with Original Drawings of Necessary Apparatus.

PRICE, $1. For Sale by

AMERICAN GAS LIGHT JOURNAL, 42 Pine St., New York City.

THE WESTERN GAS CONSTRUCTION COMPANY
WORKS AND MAIN OFFICE FORT WAYNE IND U S A
GAS ENGINEERS
EASTERN OFFICE NEW YORK CITY. 1138 Broad Exchange Building.
WESTERN OFFICE SAN FRANCISCO. 589 Howard Street.



100,000 cubic foot GASHOLDER in STEEL TANK, used as a PULSATION TANK for GAS ENGINES operating on BLAST FURNACE GAS, by the ILLINOIS STEEL COMPANY, SOUTH CHICAGO, ILLINOIS.

CONTRACTORS AND BUILDERS
EVERYTHING FOR A GAS PLANT